



**Massachusetts Military Reservation**  
***PLUME RESPONSE PROGRAM***

***Final***  
***Fuel Spill-28 Treatment System 1999***  
***Annual System Performance and***  
***Ecological Impact Monitoring Report***

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## ACRONYMS AND ABBREVIATIONS

AFCEE	Air Force Center for Environmental Excellence
AWQC	Ambient Water Quality Criteria
bgs	below ground surface
°C	temperature degrees Centigrade
cfs	cubic feet per second
CMR	Commonwealth of Massachusetts Regulation
CS-4	Chemical Spill-4
CWSW	Coonamessett Water Supply Well
DEP	Massachusetts Department of Environmental Protection
DO	dissolved oxygen
DOC	dissolved organic carbon
DPH	Massachusetts Department of Public Health
EDB	ethylene dibromide
EPA	U.S. Environmental Protection Agency
ETD	extraction, treatment, and discharge system
EW	extraction well
°F	temperature degrees Fahrenheit
FS-28	Fuel Spill-28
ft	feet
ft bgs	feet below ground surface
ft/day	feet per day
ft msl	feet mean sea level
ft <sup>3</sup> /sec	cubic feet per second
GAC	granular activated carbon
GC/MS	gas chromatograph/mass spectrometer

## ACRONYMS AND ABBREVIATIONS

gpm	gallons per minute
IG	irrigation
in	inches
IRP	Installation Restoration Program
kg	kilograms
mg/L	milligrams per liter
MMCL	Massachusetts maximum contaminant level
mS/cm	millisiemens per centimeter
MMR	Massachusetts Military Reservation
msl	mean sea level
mV	millivolt
MW	monitoring well
NPDES	National Pollutant Discharge Elimination System
NTU	nephelometric turbidity units
ORP	oxidation-reduction potential
pH	hydrogen ion activity (representation of acidity or alkalinity)
PME	Performance, Monitoring, and Evaluation Program
PVC	polyvinyl chloride
PZ	piezometer
QPP	<i>Quality Program Plan</i>
RBC	risk-based concentration
SIM	selective ion monitoring
SW	surface water
TOC	total organic carbon
USGS	U.S. Geological Survey

## ACRONYMS AND ABBREVIATIONS

VOC	volatile organic compound
YSI	Yellow Springs Instruments, Inc.
µg/L	micrograms per liter
µS/cm	microsiemens per centimeter

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## EXECUTIVE SUMMARY

This report presents the evaluation of the monitoring data collected from January through December 1999 associated with the Fuel Spill-28 (FS-28) plume and treatment system. The treatment system was designed to remove ethylene dibromide (EDB) from deep and shallow groundwater in the vicinity of the Coonamessett River and associated cranberry bogs.

The FS-28 treatment system consisted of one deep groundwater extraction well during January through March 1999. The system was expanded in April 1999 to include a series of shallow well-point extraction wells downgradient of the deep extraction well. Earthen berms were also constructed in 1999 to separate stretches of the Coonamessett River from the cranberry bogs and Broad River.

The treatment system processed approximately 16 million gallons of contaminated groundwater from January through December 1999. During 1999 an estimated 0.9 kg (2 lbs) of EDB were removed from groundwater. Approximately 2.4 kg (5.4 lbs) of EDB have been removed from contaminated groundwater since the treatment system became operational in 1997.

Coonamessett River and associated bogs were sampled monthly for EDB. EDB was not detected above the method detection limit of 0.005 µg/L in surface water samples collected after May 1999. When detected, EDB concentrations in surface water were not high enough to warrant air monitoring. The cranberry growers will not market fruit from bogs that have been EDB-free for less than one year. Because the 1999 cranberry crop was not marketable, the cranberry growers flooded the bogs in June and early July to suppress the production of fruit. If the Coonamessett River and associated cranberry bogs remain EDB-free during 2000, the cranberry crops will be marketable.

Surface water ecological benchmarks or preliminary screening-level human health risk- or hazard-based concentrations were not exceeded during the reporting period. The monitoring data indicate there were no significant ecological impacts associated with the

operation of the groundwater treatment system. However, the treatment plant effluent contained two metals, barium and zinc, which exceeded ecological benchmarks.

The hydraulic effects and potential impacts of the extraction system on the bogs and nearby wetlands are difficult to quantify due to agricultural operations and climatic influences. The hydraulic data indicate that the shallow groundwater and river system had less water during 1999 than any other time since site monitoring began in 1997. However, these conditions are not attributable to system operation. To better evaluate the impacts of the extraction system on the aquifer, river system, and nearby wetlands under current conditions, a monitored system shutdown and restart is proposed.

Groundwater concentrations of EDB within the capture zone of the deep extraction well have decreased. However, results through 1999 indicate that continued operation of the well is still appropriate. EDB concentrations downgradient of the extraction well and near the shallow well-point extraction system have also decreased. To better evaluate the configuration of the shallow extraction system, additional sampling of selected well-points within the system is proposed. In time, it is anticipated that EDB concentrations within the shallow extraction system will drop to low levels, and that in the future it may be appropriate to increase the groundwater extraction rate from the deep well to improve the efficiency of the system to capture the FS-28 plume.

The leading edge of the FS-28 plume downgradient of the shallow well-point extraction system is detached from the main body of the plume and represents less than 0.3 percent of the entire contaminant mass in the plume. Monitoring of the EDB concentrations in this part of the plume did not identify any significant changes during 1999. No significant changes in EDB concentrations were identified in the monthly groundwater monitoring upgradient and beneath the Coonamessett Water Supply Well, and the irrigation wells in the Coonamessett River Valley continue to be nondetect for EDB.

## 1.0 INTRODUCTION

This *Draft Fuel Spill-28 Treatment System 1999 Annual System Performance and Ecological Impact Monitoring Report* has been prepared for the Air Force Center for Environmental Excellence (AFCEE) as part of the U.S. Air Force Installation Restoration Program (IRP) at the Massachusetts Military Reservation (MMR) on Cape Cod under Remedial Action Contract No. F41624-97-D-8006, Delivery Orders 14 (performance monitoring), 15 (ecological monitoring), and 18 (treatment system monitoring). This assessment report meets DO15 requirements for an annual ecological assessment. Additionally, the report evaluates the 1999 monitoring data collected to assess the treatment system performance and impacts, and the Fuel Spill-28 (FS-28) plume leading edge. The report also presents the data collected to assess cranberry marketability.

The performance and treatment system monitoring data evaluated for this assessment report were collected according to the *Final Engineering Evaluation, Cost Analysis, and Execution Plan for Coonamessett River FS-28 Bog Separation Project* (AFCEE 1998f) and *Proposed Revisions to the FS-28 Monitoring Program* (AFCEE 1999f). The ecological data for this assessment report were collected according to project notes: (1) 1999 Ecological Sampling Program (AFCEE 1999a) for samples collected from January through March, and (2) FS-28 Groundwater Extraction, Treatment, and Surface Water Discharge System Ecological Sampling Strategy (Including the shallow drive point extraction wells) (AFCEE 1999b) for samples collected from April through December. These project notes supercede Section 4.0 (Ecological Monitoring) of the *Draft Final FS-28 Monitoring Plan* (AFCEE 1998d).

### 1.1 PURPOSE

The FS-28 plume is located southwest of the MMR (Figures 1-1,1-2). This study was performed to assess: (1) the performance of the FS-28 treatment system, (2) the marketability of the cranberry crops, (3) potential ecological impacts due to the operation of the treatment system, and (4) the monitoring of sentry wells near the Coonamessett Water Supply Well (CWSW).

## 1.2 OBJECTIVE

Ethylene dibromide (EDB) concentrations measured in groundwater, surface water, and irrigation water will be used to evaluate the performance of the groundwater treatment system, assess the marketability of cranberry crops, and manage human health risks. Ecological impacts associated with the operation of the treatment system will be assessed through the evaluation of water level data and the comparison of surface water parameters measured at the treatment system discharge to Commonwealth of Massachusetts water quality guidelines (3.14 CMR 4.00).

## **2.0 BACKGROUND AND SYSTEM CONFIGURATION**

### **2.1 BACKGROUND**

This section presents the site setting. The summary of the FS-28 plume characteristics and the plume's interaction with the surface water bodies has been presented in various other AFCEE documents, referenced in the following subsections. General information describing the agricultural usage of groundwater and surface water is also presented.

#### **2.1.1 Physical Location**

The MMR is located on Upper Cape Cod, and is bordered by the towns of Bourne, Falmouth, Mashpee, and Sandwich (Figure 1-1). The upgradient extent of the FS-28 plume, as currently mapped, is located in the Crane Wildlife Management Area, which is south of the MMR in Falmouth (Figure 1-2). The plume has a north-south orientation, is bordered on the east by Coonamessett Pond, on the west by Deep Pond, and becomes very narrow as it extends south of Hatchville Road in Falmouth. The leading edge of the plume is narrow, and is located between Sandwich and Turner roads, north of Thomas B. Landers Road. The plume axis at the toe generally parallels and is coincident with the Coonamessett River, which flows south from the western arm of Coonamessett Pond to a tidal estuary, Great Pond, south of Route 28 in Falmouth.

#### **2.1.2 Site Characteristics**

The FS-28 plume was first identified in 1992 when its upgradient extent was encountered near the leading edge of the CS-4 plume. In 1996, the downgradient extent of the FS-28 plume was determined to be emerging in the Coonamessett River. The area surrounding the FS-28 plume has been studied extensively during the past three years. The following discussion summarizes the site characteristics as documented in recent AFCEE documents addressing the FS-28 plume (AFCEE 1997b, 1998b, 1999c, and 1999d).

##### **2.1.2.1 FS-28 Plume Characteristics**

The FS-28 (EDB) plume is a detached plume; its source has not been identified. It extends from the Crane Wildlife Management Area north of Route 151, flows under the

western portion of Coonamessett Pond, and terminates in the cranberry bogs surrounding the Coonamessett River (Figure 2-1). Although a small portion of the distal extent of the plume is present in the subsurface just north of Thomas B. Landers Road (less than 0.3 percent of the total plume mass), most of the plume is being captured by the remediation systems discussed in Section 2.2.

EDB is the contaminant of concern in the FS-28 plume. The maximum detected concentration of EDB (by low-level analytical method 504<sup>11</sup>) was 16 micrograms per liter ( $\mu\text{g/L}$ ) in a sample of deep groundwater (collected 8 January 1997 from monitoring well 69MW1304) just south of Hatchville Road. Concentrations significantly decrease to the north. Based on three-dimensional contouring of analytical data collected from 1996 to 1998, the FS-28 plume is comprised of approximately 11.7 kilograms (kg) of EDB within approximately 4.4 billion gallons of groundwater (AFCEE 1999e). North of Route 151, the FS-28 plume is laterally and vertically discontinuous at elevations ranging from -20 to -220 feet mean sea level (ft msl). The upgradient extent of the FS-28 plume is difficult to define because the concentrations are less than 0.1  $\mu\text{g/L}$  and generally close to the average EDB detection limit of 0.004  $\mu\text{g/L}$ . The northern-most detection of EDB associated with the FS-28 plume is located approximately 1000 feet south of the MMR boundary.

The FS-28 plume is migrating to the surface south of Hatchville Road (AFCEE 1997b). The groundwater containing the plume is generally flowing in a southern direction, and rises slightly to discharge in the Coonamessett River. The average linear velocities of groundwater flow range from 0.02 to 0.2 feet per day (ft/day) for silty sands and 0.2 to 2 ft/day for outwash sands (AFCEE 1997b). Near the groundwater discharge areas, groundwater velocities are likely significantly higher. Various numerical groundwater models that simulate the FS-28 plume transport have predicted that, if left uncaptured, most of the EDB would discharge to the Coonamessett River north of Sandwich Road,

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<sup>1</sup> The VOC analysis (method 524) of this sample indicated that it contained EDB at a concentration of 18  $\mu\text{g/L}$ .

and the rest would migrate in the subsurface, very close to the river, eventually surfacing at points along the length of the river north of Great Pond.

Extensive surface water and shallow groundwater sampling has been conducted in the Coonamessett River and associated cranberry bogs since October 1996. Previous studies have confirmed that the upwelling of EDB-contaminated water is limited to the Baptiste bogs. In general, the EDB-contaminated water has been found to emerge to the surface in and south of Broad River, and north of the Adams and Augusta bogs. Once the contamination reaches the surface, it flows downstream in the river system. Since the river continues to gain clean groundwater from the aquifer as it flows downstream to the south, concentrations generally decrease with downstream distance. Detectable concentrations have historically been measured in water downstream of Pond 14 (Figure 2-1).

#### **2.1.2.2 Surface Water Hydrology**

Measurements by AFCEE and the U.S. Geological Survey (USGS) indicate that the Coonamessett River does not gain much water (and occasionally loses water) along the reach from its origination at Coonamessett Pond to where it crosses Hatchville Road and enters the cranberry bogs. Once the river enters the bogs, the river gains a significant amount of water from groundwater discharge. South of Thomas B. Landers Road, the river continues to gain approximately 1 cubic foot per second (cfs) with every 1000 feet of river reach, with over 15 cfs of flow where the river becomes inter-tidal.

Throughout the river system, flow is controlled by weirs and culverts managed by the cranberry cultivators and town officials who manage fish migration. South of Sandwich Road, the river flows through an abandoned cranberry bog which has developed over several decades into a reservoir called Pond 14 (Figure 2-1). On the downstream side of Pond 14, a dam is used to control water flow to the downstream river and bogs.

### 2.1.3 Agricultural Use of Water

Approximately 68 acres of agricultural crops south of Hatchville Road are irrigated from either groundwater wells or surface water. AFCEE has contacted all of the bog owners and other agricultural users of the Coonamessett River to discuss their irrigation practices. The U.S. Environmental Protection Agency (EPA), Massachusetts Department of Environmental Protection (DEP), and Massachusetts Department of Public Health (DPH) have determined that the use of EDB-contaminated surface and groundwater for agricultural purposes presents an unacceptable risk to public health and the environment. Remedial actions have been taken by AFCEE to provide clean water for agricultural purposes at the site.

In the spring, the irrigation of cranberry bogs begins near the middle of April when the night temperatures are anticipated to be lower than 32°F. For frost control, spray irrigation is conducted from about 11 p.m. to 9 a.m. and continues as needed until mid-June. From mid-June to October, the fields are irrigated as needed to provide at least 2 inches of water on the crop per week. With the exception of the Augusta Bog, which is supplied by its own reservoir, and the Upper Baptiste Bog, which is supplied by clean water from the treatment plant, irrigation wells are used to supply water for spray irrigation (Figure 2-1). In 1997 and 1998, AFCEE installed 10 irrigation wells in the bogs surrounding the Coonamessett River to replace the surface water sumps which were previously used.

The irrigation system for the Reservoir Bog is configured to use one pump to extract groundwater from two wells (69IG0005 and 69IG0006). The system at the Lower Bog is set up in the same way with 69IG0007 and 69IG0008. The wells are not configured to allow discrete samples to be collected from each well because they share one pump at each location. The samples collected from these wells, therefore, represent the composite of groundwater from the pair of wells. Although the sample and location identifications reference individual wells, the samples are essentially field duplicates of the combined groundwater. The irrigation system used for the Andrews Farm can use two irrigation wells (69IG0009 and 69IG0010). However, since these wells have dedicated pumps,

they can be sampled individually. The farmer can choose to irrigate with either one or two wells. If two wells are used, the water is combined before entering the irrigation system.

During the fall, the bogs are harvested dry or wet. North of Pond 14, the cranberry growers utilize both ground and surface waters to wet-harvest their crops. The Pond 14 reservoir is used as the water source for flooding the downstream Reservoir, and the Middle and Lower bogs (Figure 2-1). The cultivated bogs are typically flooded again in late November to early December to prevent frost damage to the cranberry vines. During flooding, the Coonamessett River is dammed up; this raises the water level from 0.5 to 3 feet over the area of the cultivated bogs.

## **2.2 SYSTEM CONFIGURATION**

The following subsections summarize the systems that extract EDB-contaminated groundwater, treat the groundwater to remove EDB, and discharge the treated water to the Coonamessett River.

### **2.2.1 Groundwater Extraction System**

Since 14 October 1997, deep groundwater has been extracted through one extraction well (69EW0001) and has been treated in a granular activated carbon (GAC) system and discharged into the Coonamessett River. The 8-inch diameter well is screened from 160 to 220 feet below the ground surface (ft bgs), and intercepts the part of the FS-28 plume containing the highest concentrations of EDB. During the first year and a half of operation, the extraction well pumped in the range of 600 to 740 gpm. Currently the well is extracting at a flow rate of 400 gpm so the existing treatment plant can accommodate the 350 gpm being extracted from the shallow well-point extraction system. Details of the installation, effectiveness, and impacts of the groundwater extraction system, as originally configured, are presented in the *FS-28 Treatment System Extraction Well-1 (EW-1) Evaluation Report Time Critical Response Action* (AFCEE 1998b).

Following the implementation of the EW-1 extraction, treatment and discharge system as a time-critical removal action, AFCEE expanded the remediation system as part of a non-time-critical removal action. The non-time-critical removal action consisted of physically separating the contaminated river from the cranberry bogs using earthen berms and vinyl sheet piles, supplying clean water to all agricultural users on the Coonamessett River, and adding additional extraction (of shallow groundwater) to the existing treatment and discharge system. The non-time-critical removal action was implemented from late 1998 to early 1999 to provide additional protection to human health and the environment by preventing EDB-contaminated groundwater from upwelling to the surface. The *FS-28 Interim Action Start-Up Monitoring Report* presents the data collected during the start-up of the shallow well-point extraction system (AFCEE 1999e).

Shallow groundwater is extracted using a well-point system installed in the lower Baptiste bogs as shown in Figure 2-2. The shallow well-point system consists of a group of closely spaced wells connected to a header pipe or manifold and pumped by suction lift. Figure 2-3 illustrates an individual well-point connection to the header pipe. A central pump lifts water from each well by producing a partial vacuum in the header and the riser pipes. The system was designed to intercept the shallow groundwater while not de-watering or impacting groundwater upwelling in the adjacent bog channels.

A typical well-point for this project consists of a 2-inch steel pipe installed to a depth of 13 ft bgs with a 2.3-foot or 3.0-foot screen connected to a PVC header system (Figure 2-3). Pilot testing of 36 well-points installed in October 1998 demonstrated that the extraction technology could effectively be used to capture the shallow groundwater. In February 1999, the shallow well-point extraction system was expanded by adding an additional 168 well-points. The current wellfield configuration of the shallow well-point extraction system is shown in Figure 2-4. As shown in the figure, groundwater is currently extracted through only 86 of the 204 well-points. No direct ecological impacts were observed during start-up of the shallow extraction system. However, shallow groundwater levels at monitoring well cluster 69MW1285 A,B dropped slightly more than 0.5 feet.. The system design is flexible, allowing for the size and shape of the

capture zone to be modified, if necessary. Table 2-1 summarizes the well completion and the final screen elevations for the installed well-points. The vacuum extraction system is currently operating at a flow rate of 350 gpm; theoretically, each of the 86 well-points currently being used is operating at 4.1 gpm.

From the well-point vacuum extraction pump, the extracted water is discharged to an 800-gallon steel tank where it is then pumped to the treatment plant building. The tank removes any air that may be entrained into the system from vacuum pumping and provides a sump from which the water can be pumped with increased line pressure to the treatment plant. Because the well-point system operates on a vacuum, the water and air influent must be separated in the tank to prevent a buildup of air in the carbon filters; this allows the discharge pressure to be boosted with a conventional centrifugal pump. Instrumentation and controls within the plant maintain and balance the flow rates and will shut down the pumps if unanticipated events occur. The booster pump is designed to match the vacuum extraction rate. Figure 2-5 schematically illustrates the flow of groundwater processed by the FS-28 treatment system.

### **2.2.2 Treatment System**

Granulated activated carbon (GAC) is used as the primary treatment technology. The system includes two 20,000-pound carbon vessels operated in series. The influent from the deep and shallow well extraction is combined inside the plant so that the pressures entering the vessels are balanced. The influent passes through a flowmeter upon entering the system. Currently the system is treating combined influent at a flow rate of 750 gpm. Since the treatment system began operation in October 1997, carbon has been replaced four times, and an estimated 5.4 pounds of EDB have been removed by the treatment plant. The mass of EDB within the plume (based on data collected before treatment began) is approximately 11 kg, and the plume is anticipated to meet MMCLs in about 18 years with the current system.

### **2.2.3 Surface Water Discharge System**

Treated water is discharged at a total flow rate of 750 gpm to the surface water. Figure 2-2 shows the primary discharge location on the western side of the Upper Baptiste bogs. At the end of the effluent pipeline, treated water flows into a vertical riser called a bubbler, constructed of 18-inch diameter corrugated metal pipe. Water cascades out of the bubbler into the Coonamessett River. The bubbler is designed to increase the levels of dissolved oxygen in the treated water.

To ensure that clean water will be available for cranberry bog flooding, the discharge system was designed to allow treated water to be discharge at six alternate locations (Figure 2-5). Remote discharge is available in the Adams Bog, Augusta Bog, Augusta Bog Reservoir, Quanamet Bog, Chaston Bog, and the East Thompson Bog (Figure 2-1). Bubblers are installed at each potential discharge location. At the primary discharge location, treated water can also be directed to flow through the spray irrigation system for the adjacent cranberry bog.

### 3.0 MONITORING ACTIVITIES

Activities include the monitoring of groundwater, surface water, and the treatment system. Monitoring activities and analyses were performed in accordance with the monitoring plans identified in Section 1.0 and the *Quality Program Plan* (QPP) (AFCEE 1998a).

The Ecological Studies Program work plan does not address the evaluation of ecological impacts in ecosystems impacted by agricultural activities (i.e., cranberry growing) (AFCEE 1998c). Therefore, AFCEE, with the approval of regulatory agencies, amended the ecological monitoring for rivers, wetlands, and vernal pools associated with the FS-28 treatment system by eliminating reference areas.

#### 3.1 GROUNDWATER MONITORING

Groundwater monitoring was conducted to address multiple objectives:

- Monitor the migration of the uncaptured portion of the FS-28 plume which is downgradient of the shallow extraction system.
- Evaluate the performance of the treatment system with respect to plume capture.
- Evaluate the quality of groundwater for agricultural uses.
- Evaluate the quality of groundwater upgradient of the Coonamessett Water Supply Well (CWSW).
- Evaluate the hydraulic impact of groundwater extraction on nearby wetlands.
- Evaluate the distribution of EDB surrounding the deep extraction well and shallow well-point extraction system to identify where the reconfiguration of the extraction system and flow rates can maximize capture efficiency.

Since various aspects of the surface water monitoring program address more than one of these objectives, Sections 3.3 through 3.7 describe the objective-specific monitoring programs.

### 3.1.1 Hydraulic Monitoring in Groundwater

For the beginning of 1999, the hydraulic monitoring program for groundwater was represented by Table 7-5 in the *Final EE/CA and Execution Plan for Coonamessett River FS-28 Bog Separation Project* (AFCEE 1998f), which was identical to Table 4-2 in the *Draft Final FS-28 Monitoring Plan* (AFCEE 1998d). Those tables identified 18 locations for monthly groundwater levels. Through comment resolution on the latter document and because of the addition of the shallow well-point extraction system in the spring, the hydraulic monitoring program changed mid-year. The current hydraulic monitoring program (of 19 monthly locations for groundwater levels) is referenced in a project note (AFC-J23-35S18901-P1.2-0005) which was issued as a revision to the MOR on the *Draft Final FS-28 Monitoring Plan* (AFCEE 1998d) on 18 June 1999, and supercedes the response and resolution that was presented in the memorandum of resolution issued 4 June 1999 for the *Draft Final FS-28 Monitoring Plan* (AFCEE 1998d).

Groundwater levels were measured monthly from January through December 1999 in up to 39 piezometers and wells, 20 of which were not part of the current monitoring plan (Figure 3-1, Table 3-1). Section 3.9.1.1 explains deviations from the monitoring plan. Groundwater levels were monitored in accordance with MMR Tech-006, Static Water Level and Total Depth Measurement (AFCEE 1998a). Deviations from the hydraulic groundwater monitoring program are discussed in Section 3.9.1.

### 3.1.2 Contaminant Monitoring in Groundwater

The groundwater monitoring program entails primarily monitoring EDB concentrations in and around the FS-28 plume (Table 3-2). However, two monitoring wells (69MW1304 and 69MW1310) were sampled monthly for physicochemical parameters to characterize the upgradient groundwater prior to treatment (Table 3-2). In October 1999, the EPA, DEP, and AFCEE agreed to discontinue monitoring these wells for physicochemical analysis (AFCEE 1999e). As part of treatment system operation and maintenance, the influent stream is also monitored regularly for analyses other than EDB.

The long-term monitoring program for EDB in FS-28 groundwater can be described as comprising three subcomponents:

- monthly analysis of pre-treated water from the CWSW, and water from three CWSW sentry wells,
- annual analysis of water from all irrigation wells in the Coonamessett River Valley, biweekly analysis of water from the four irrigation wells and one surface water location located closest to the FS-28 plume, and water from a sentry well for an irrigation well at Coonamessett Farm,
- quarterly analysis of water in selected wells upgradient of the deep extraction well, wells between the extraction well and the shallow well-point extraction system, and wells downgradient of the shallow well-point extraction system.

Sections 3.3, 3.5, 3.7, and 3.8.2 discuss these components of the groundwater monitoring program in more detail. Groundwater sampling was performed in accordance with MMR TECH-015, the groundwater purging and sampling procedure (AFCEE 1998a).

## **3.2 SURFACE WATER MONITORING**

Surface water monitoring was conducted to address multiple sampling monitoring objectives:

- evaluate potential risks to human and ecological receptors from exposure to EDB in surface water,
- evaluate performance of the treatment system at capturing the plume,
- evaluate the chemical and hydraulic impact of groundwater extraction and surface water discharge on the river system and nearby wetlands,
- evaluate the quality of river water for agricultural uses, and
- further refine our understanding of the natural and anthropogenic variations of the river system,
- evaluate potential ecological impacts associated with the operation of the groundwater treatment system.

Since various aspects of the surface water monitoring program address more than one of these objectives Sections 3.3 through 3.8 describe the objective-specific monitoring programs.

### 3.2.1 Surface Water Discharge and Elevation Monitoring

Surface water discharge was measured each month from January through December 1999 at five locations (69SW0006, 69SW0010, 69SW0046, 69SW0049, and 69SW0058, shown in Figure 3-2). Except for 69SW0010, these locations were identified for monthly discharge monitoring in the *Draft Final FS-28 Monitoring Plan* (AFCEE 1998d) and the *Final EE/CA and Execution Plan for Coonamessett River FS-28 Bog Separation Project* (AFCEE 1998f). In June, AFCEE modified the ecological impact monitoring program for FS-28 to include monthly monitoring at 69SW0010 (AFCEE 1999b).

Discharge measurements included stream elevation in mean sea level (msl) and flow in cubic feet per second (cfs) at five locations along the Coonamessett River (Figure 3-2, Table 3-3). Discharge measurements were performed in accordance with MMR Tech-003, Stream Gauging (AFCEE 1998a). Surface water elevations were measured monthly at 69SW0003, 69SW0014, and 69SW0057 (Figure 3-1, 3-2), although this was not part of the monitoring plan.

### 3.2.2 Surface Water Sampling

Surface water samples were collected from the Coonamessett River for chemical and physicochemical parameters from January through December 1999 (Table 3-4). For monitoring the ecological impact of discharge on river quality, physicochemical parameters were measured at 69SW0006 and 69SW0065 four times during 1999 (Figure 3-3 and 3-4). In May, samples collected from 69SW0024, 69SW0049 and 69SW2008 were analyzed for VOCs. All other surface water samples were analyzed for EDB, and those monitoring programs are discussed further in Sections 3.3 and 3.4.

During each round of sampling, field parameters (i.e., temperature, DO, specific conductivity, pH, and turbidity) were measured at all locations in accordance with MMR Tech-011, Field Measurements, using the Yellow Springs Instruments (YSI) 6820 water quality meter (AFCEE 1998a). Hourly measurements of field parameters were recorded at location 69SW0065 because this is immediately downstream of the discharge location.

Surface water samples were collected in accordance with MMR Tech-017, Surface Water Sampling (AFCEE 1998a).

### 3.3 IRRIGATION WATER MONITORING

The monitoring program to evaluate potential impacts to irrigation water supplies is outlined in the *Draft Final FS-28 Monitoring Plan* (AFCEE 1998d) and the *Final EE/CA and Execution Plan for Coonamessett River FS-28 Bog Separation Project* (AFCEE 1998f). According to the plan, all of the irrigation wells in the Coonamessett River Valley (Figure 2-1) are sampled in the spring, prior to the growing season. Throughout the irrigation season, certain wells located at the leading edge of the FS-28 plume (69IG0002, 69IG0003, and 69IG0004) are sampled biweekly.

Since the monitoring plan was issued, a new well (69IG0012) was added to the biweekly sampling program. In the spring of 1999, 69IG0002 was taken out of operation. Additionally, the irrigation water quality monitoring program for the 1999 season was affected by the assumption that the 1999 cranberry crop would not be marketable. Because the crop would not be marketable, the cranberry growers flooded the bogs at various stages between mid-June and early July to suppress blossoming and ultimately, the production of cranberries on the vines. Additional bogs were also flooded in early June to control a fireworm problem. Prior to the flooding, there was no need to use spray irrigation. Therefore, the samples collected in June represent the first usage of the wells for the 1999 growing season.

Annual sampling of irrigation wells was conducted in accordance with the monitoring plan (AFCEE 1998d, f), and was conducted from February to mid-June. Irrigation wells 69IG0005 and 69IG0006 were sampled for EDB and volatile organic compounds (VOCs). Irrigation wells 69IG0007, 69IG0008, and 69IG0013 were sampled for EDB. Irrigation wells 69IG0009 and 69IG0010 are also part of the Ashumet Valley monitoring program, and are thus analyzed for additional parameters. Irrigation well 69IG0009 was sampled for EDB and VOCs; irrigation well 69IG0010 was sampled for EDB, VOCs, total metals, and hardness.

Seven rounds of sampling were conducted in irrigation wells 69IG0003, 69IG0004, and 69IG0012. These wells were sampled for EDB on a biweekly basis from mid June to mid September.

In September, irrigation well 69IG0001 was sampled at the request of Mr. Handy, who operates the Upper Baptiste Bog. The well has not been used for irrigation since 1997 when the treatment system became operational. The irrigation system previously supplied by 69IG0001 now draws clean water from the treatment plant.

The Augusta Bog has a surface water reservoir rather than an irrigation well. For the Augusta Bog water supply, location 69SW0060 was monitored biweekly for EDB during the irrigation season, and monthly during the rest of the year.

The Coonamessett Farm, located just west of the FS-28 plume south of the western arm of Coonamessett Pond, has a well which is used for irrigation. Although this well is located outside of the plume boundary and no EDB has ever been detected at this site, AFCEE installed a sentry well, 69MW1501, just upgradient of the irrigation well and screened at the same depth. Samples were collected monthly from 69MW1501 for all of 1999, and analyzed for EDB.

Tables 3-2 and 3-3 summarize the groundwater and surface water sampling for chemical and physicochemical parameters for 1999, and include the irrigation wells and surface water locations used for monitoring irrigation water quality.

### **3.4 CRANBERRY MARKETABILITY MONITORING**

The *Final EE/CA and Execution Plan for Coonamessett River FS-28 Bog Separation Project* (AFCEE 1998f) outlines the surface water monitoring of EDB concentrations in surface water for the bogs surrounding the Coonamessett River. The purpose of the monitoring was to provide a basis for decisions regarding cranberry crop marketability. Three surface water monitoring locations (69SW0014, 69SW0046, and 69SW0049) are also sampled monthly for risk monitoring, discussed in Section 3.8.1. For the

marketability monitoring, locations were identified to represent the inflow and outflow waters of each bog. To market the cranberries, the water that comes in contact with the vines must have nondetectable levels of EDB for at least one year (AFCEE 1998f). All samples are submitted for low-level EDB analysis by EPA Method 504.

The monitoring plan identifies 25 locations to be monitored on a monthly basis: 69SW0006, 69SW0008, 69SW0011, 69SW0024, 69SW0046, 69SW0047, 69SW0048, 69SW0051, 69SW0052, 69SW0060, 69SW2000, 69SW2001, 69SW2002, 69SW2003, 69SW2004, 69SW2005, 69SW2006, 69SW2007, 69SW2008, 69SW2009, 69SW2010, 69SW2011, 69SW2012, 69SW2013, 69SW2014. In addition to these locations, samples were also collected from locations 69SW0014, 69SW0019, 69SW0049, 69SW2018, and 69SW2019. All surface water sampling locations for evaluating cranberry crop marketability and monitoring risk are shown in Figures 3-3, 3-4 and 3-5. Section 3.9.2 discusses deviations from the monitoring plan.

### **3.5 COONAMESSETT WATER SUPPLY WELL MONITORING**

Falmouth's CWSW is located approximately 500 feet south of the western arm of Coonamessett Pond (Figure 3-6). The well is constructed of a 36-inch diameter casing and a 10-foot long well screen, extending from 50 to 60 feet bgs (AFCEE 1996). As a precaution, AFCEE installed a granular carbon filtration system for the CWSW in 1996, and continues to operate and maintain this system. AFCEE also monitors the influent to the carbon filtration system on a monthly basis, and collects samples from three sentry wells (69MW1279A, B, and C) monthly. All samples are analyzed for EDB. During 1999, samples were collected every month from the pre-filtered water from the supply well and the three sentry wells.

### **3.6 AIR MONITORING**

AFCEE has agreed to monitor EDB concentrations in air if surface water concentrations of EDB are greater than 0.5 µg/L (AFCEE 1998f, 1998d). During 1999, concentrations of EDB in the river were far less than this air monitoring trigger, so air monitoring in the bogs was not necessary.

### 3.7 TREATMENT SYSTEM MONITORING

As part of monitoring the performance of the extraction, treatment and discharge system, nine wells surrounding extraction well EW-1 were identified in the monitoring plans (AFCEE 1998d, 1998f) to monitor system performance. Monitoring wells 69MW1284A, 69MW1284B, 69MW1285A, 69MW1285B, 69MW1291A, 69MW1291B, 69MW1303A, 69MW1303B, and 69MW1304 are sampled quarterly for EDB (Figure 3-6, 3-7). Quarterly groundwater monitoring of EDB is also performed at the uncaptured leading edge of the plume; this monitoring is discussed later in Section 3.8.2.

The treatment system monitoring program was performed according to:

- Final Engineering Evaluation, Cost Analysis, and Execution Plan for Coonamessett River FS-28 Bog Separation Project (AFCEE 1998f),
- National Pollutant Discharge Elimination System (NPDES) permit exclusion letter dated 11 February 1999,
- Mr. Robert Lim's (EPA) e-mail dated 02 March 1999 regarding the NPDES permit exclusion, and
- NPDES permit exclusion letter dated 05 November 1999.

Table 3-5 presents a schedule of the treatment plant monitoring performed during January through December 1999.

Five sampling ports were monitored from the treatment system: (1) The deep extraction well 69EW0001, (2) sample port 69PLT01023 which is located between the shallow well-points booster pump and the combined influent water sampling port (69PLT01001), (3) 69PLT01002 or 69PLT01003 depending upon which carbon vessel is functioning as the lead unit; this port indicates water quality after the primary treatment through the lead vessel, and (4) the treatment plant effluent port 69PLT01010 which is located after the carbon vessels (Figure 2-5).

### 3.8 RISK MANAGEMENT

A preliminary screening level risk evaluation was conducted to determine whether chemicals detected at the pilot test site are present in concentrations that may be harmful to human or ecological receptors. Environmental media of concern for this evaluation included: surface water, air, and the treatment plant effluent.

#### 3.8.1 Surface Water

In the evaluation of ecological risk, maximum detected concentrations of analytes were compared to EPA surface water benchmarks obtained from *Ecotox Thresholds* (EPA 1996). For human health, maximum detected concentrations were screened against hazard- and risk-based concentrations developed for surface water. The screening level human health risk evaluation assesses imminent risk, that is, an excess individual cancer risk of  $1 \times 10^{-3}$  for carcinogenic compounds and a hazard quotient of 10 for non-carcinogenic compounds. For the purpose of monitoring potential risk to human and ecological receptors, locations 69SW0006, 69SW0046, and 69SW0047 were monitored monthly for EDB (Figures 3-3, 3-4 and 3-5). The monitoring of EDB in these surface water locations is also part of the cranberry marketability monitoring discussed previously in Section 3.4. All surface water samples that were analyzed for EDB during the reporting period were evaluated in this assessment report.

#### 3.8.2 Groundwater

A portion of the FS-28 groundwater plume is not captured by the extraction systems. It is anticipated that this portion of the plume will continue to migrate in the subsurface and eventually discharge to the Coonamessett River south of Thomas B. Landers Road. As this detached portion of the plume migrates southward, it narrows to a very thin plume, and moves upward gradually, rising approximately 4 to 5 feet for every 100 feet in the downgradient direction. To monitor the advancement of this uncaptured portion of the plume, the monitoring plans (AFCEE 1998d, 1998f) identified eight wells for quarterly monitoring of EDB (69MW1286, 69MW1300A, 69MW1300B, 69MW1302,

69MW1306A, 69MW1306B, 69MW1308, and 69MW1309). These wells are shown in Figure 3-6 and 3-7.

### **3.8.3 Treatment System Effluent**

In the evaluation of ecological risk, maximum detected concentrations of analytes were compared to EPA surface water benchmarks obtained from *Ecotox Thresholds* (EPA 1996). For human health, maximum detected concentrations were screened against hazard- and risk-based concentrations developed for surface water. The screening level human health risk evaluation assesses imminent risk, that is, an excess individual cancer risk of  $1 \times 10^{-3}$  for carcinogenic compounds and a hazard quotient of 10 for non-carcinogenic compounds. Treatment system effluent analytical data collected during the reporting period were evaluated for ecological risk and screening level human health risk.

## **3.9 DEVIATIONS FROM THE MONITORING PLAN**

This section describes deviations from the monitoring plans for the collection of groundwater, surface water, and treatment system samples or measurements during the reporting period (AFCEE 1998d, 1998f, 1999a, 1999b, 1999f).

### **3.9.1 Groundwater Monitoring**

This section identifies variations from the monitoring program for groundwater levels (hydraulic monitoring) and quality (groundwater sampling) for the period from January 1999 through December 1999. Deviations from the program for monitoring irrigation wells and the CWSW are discussed separately in Sections 3.9.3 and 3.9.5, respectively.

#### **3.9.1.1 Hydraulic Monitoring**

As mentioned previously in Section 3.1.1, the standing monitoring plan in early 1999 called for monthly monitoring of groundwater levels at 18 locations (69MW1284A, 69MW1284B, 69MW1290A, 69MW1290B, 69MW1292, 69MW1293A, 69MW1293B, 69MW1303A, 69MW1303B, 69MW1304, 69MW1310, 69PZ0110, 69PZ0111,

69PZ0112, 69PZ0113, 69PZ0114, 69PZ0115, 69PZ0116) (AFCEE 1998f). Water levels were monitored in all of these locations all year, with the following exceptions:

- No measurements were made at 69PZ0110 because the piezometer was damaged.
- No measurements were made at 69PZ0114 in January, February, and June due to scheduling conflicts.
- No measurements were made at 69PZ0115 in June, July, August, September and October because the piezometer contained an obstruction.
- No measurements were made at 69PZ0116 in June due to scheduling conflicts.

In June, the hydraulic monitoring plan was modified; location 69PZ0110 was dropped, and locations 69MW1285A and 69MW1294 were added. Water levels were collected monthly at locations 69MW1285A and 69MW1294 from May through December 1999. The modifications also included referencing a piezometer, 69PZ0016, for Wetland 1285, although it was never installed.

Water level measurements were also made monthly at locations 69PZ1284A, 69PZ1284B, 69PZ1292A, 69PZ1292B, 69PZ1293A, 69PZ1293B, 69PZ1303A, 69PZ1303B, 69PZ1303C, 69PZ1304A, 69PZ1304B, 69PZ1310A, and 69PZ1310B from January through December 1999, and at locations 69MW1285B, 69PZ1285B, 69MW1288, 69MW1291A, 69MW1291B, 69PZ1291A, and 69MW1296A from May through December 1999.

#### **3.9.1.2 Groundwater Sampling**

Sampling was conducted as planned with the following exception: The quarterly groundwater monitoring rounds were conducted in May, July, and September. A fourth round would have been conducted in December, but was moved to January 2000 as part of a program-wide effort to redistribute sampling and analytical resources for long-term monitoring programs (AFCEE 2000a).

#### **3.9.2 Surface Water Monitoring**

Due to weather conditions, no sample was collected in January from location 69SW0049, one of the three locations used for risk monitoring. However, it is presumed that EDB

concentrations at location 69SW0049 were nondetectable during the January sampling round because no EDB was detected in the samples collected from the upstream location 69SW0048 and downstream location 69SW2008.

As mentioned in Section 3.2.1, the plan at the beginning of 1999 called for monthly discharge measurements from locations 69SW0006, 69SW0046, 69SW0049, and 69SW0058. Location 69SW0010 was added in June. The following exceptions to the plan were noted for 1999:

- Discharge measurements were not made at 69SW0006 after May or 69SW0058 after June due to low flow in the Coonamessett River.
- Discharge measurements began at 69SW0010 in August when the staff gauge was installed and continued monthly through December.
- No discharge data were collected at 69SW0046 in January due to flooded bogs, and in June and July due to low flow. Measurements during June and July could not be taken due to low flow in the Coonamessett River.

Ecological monitoring locations 69SW0003, 69SW0010, 69SW0058, and 69SW0065 were not sampled in January and location 69SW0003 in February due to scheduling conflicts. Sample location 69SW0003 was not sampled in October, November and December and 69SW0058 was not sampled in August, November and December due to low flow in the Coonamessett River.

### **3.9.3 Irrigation Water Monitoring**

As mentioned in Section 3.3, there were some changes to the monitoring program for irrigation wells. The following deviations were noted:

- 69IG0012 was added to the monitoring program for biweekly analysis of EDB during the irrigation season.
- In the spring of 1999, 69IG0002 was taken out of service, and thus not sampled.
- At the request of Mr. Handy, irrigation well 69IG0001 was sampled in September.
- The spring annual sampling of some wells was delayed because the bogs were being flooded, and the wells were not used until June.

### 3.9.4 Cranberry Marketability Monitoring

For the Baptiste Bogs, five locations (69SW0006, 69SW0011, 69SW0008, 69SW2000, and 69SW0024) were planned for monthly sampling for EDB. Sampling was conducted as planned for the Baptiste Bogs, with the following exceptions (in order from upstream to downstream):

- No samples were collected from location 69SW0008 in January, February, or March because the bog was flooded.
- A new monitoring location was added to the Upper Baptiste Bogs. Location 69SW2018 was added just downstream of the treatment plant bubbler because a new culvert (outflow location) was added to connect the most downstream segment of the Upper Baptiste Bogs to the Coonamessett River. This location was first sampled in December.
- No samples were collected from location 69SW2000 in January and February because the bog was flooded.
- Samples were also collected monthly (January through December) from location 69SW0014 in Broad River.
- A new location, 69SW0019, was added, presumably because the newly-constructed berm divides the Lower Baptiste Bog. This location was sampled 11 times in April, three times in June to monitor the effectiveness of the shallow well-point extraction system, and monthly from July through December.
- Samples were collected from the 69SW0024 location 11 times in April, three times in May, and twice in June to monitor effectiveness of the shallow well-point extraction system.

The monthly monitoring of the Adams Bog inflow (69SW2004 and 69SW2013) and outflow (69SW2014) was conducted according to the plan, except that samples were not collected from the inflow locations in February due to scheduling conflicts.

Monitoring was conducted according to the monitoring plan for the West Thompson Bog, the Augusta Bog, the Quanamet Bog (formerly called the Lassalle Bog), the Chaston Bog, the Reservoir Bog, the Middle Bog, the Lower Bog, or the bogs south of Flax Pond. For the remainder of the bogs south of Thomas B. Landers Road, the following exceptions were noted:

- Location 69SW0047, on Thomas B. Landers Road, was not sampled in September due to a scheduling conflict.
- Location 69SW2008, at the outflow of Pond 14, was sampled three times in May.
- Location 69SW2010, in the ditch between Pond 14 and Flax Pond, has been dry since April and has not been sampled since.
- A new location was added in December to represent the outflow from Flax Pond. This new location, 69SW2019, replaces 69SW2011, since the weir controlling the flow out of Flax Pond has been moved.

### **3.9.5 Coonamessett Water Supply Well Monitoring**

As mentioned in Section 3.5, there were no deviations from the plan for monitoring the groundwater upgradient and beneath the CWSW.

### **3.9.6 Treatment System Monitoring**

The FS-28 treatment plant monitoring program was effectively implemented from January through December 1999.

## **4.0 RESULTS**

This section presents the evaluation of groundwater, surface water, and treatment system monitoring data collected during the reporting period. All data collected during the reporting period were used in this assessment report.

### **4.1 GROUNDWATER-SURFACE WATER HYDROLOGY**

Precipitation data, cranberry bog flooding and irrigation information, Coonamessett River discharge data, and groundwater elevation data are used to evaluate the hydraulic impacts, if any, of extraction system pumping. Impacts to groundwater-flow patterns, river discharge, the 1285 Wetland, and Vernal Pool 390 are the focus of this assessment. Section 4.1.3 presents a detailed discussion of groundwater elevation data. A more general discussion is presented in Section 6.1.

#### **4.1.1 Precipitation Data**

Daily precipitation data was recorded at Otis Air National Guard Base from January 1999 through December 1999. The mean daily precipitation per month, for calendar year 1999, plotted against the 20-year average (1979 – 1998) is shown in Figure 4-1. The data show that January, February, and October were wetter than the 20-year average while March, April, May, June, July, September, November, and December were drier than the 20-year average. One noticeable conclusion that can be made from Figure 4-1 is that the summer of 1999 was drier than the average summer.

#### **4.1.2 Coonamessett River Discharge Data**

Surface water discharge was measured each month from January through December 1999 at four locations (69SW0006, 69SW0046, 69SW0049, and 69SW0058) along the Coonamessett River. Location 69SW0010 was added to the monthly monitoring program in September 1999. Prior to September, location 69SW0009 (the nearest upstream location to 69SW0010) was substituted for location 69SW0010. A plot of Coonamessett River discharge over a period from 04 January 1997 through 01 January 2000, for these

five locations, is shown in Figure 4-2. Table 4-1 presents the 1999 discharge data. Table 3-3 shows the dates that surface water measurements were taken along with other observations that influenced or prevented the collection of stream discharge measurements.

Figure 4-2 shows that the largest river discharges are associated with monitoring location 69SW0049, followed by location 69SW0046. This observation is consistent with the FS-28 conceptual model, which has the Coonamessett River gaining a significant amount of water from groundwater discharge (both from upward groundwater flow gradients and from discharge from the deep and shallow groundwater extraction systems) once the river crosses Hatchville Road and enters the cranberry bogs.

The average stream discharges, for the years 1997, 1998, and 1999, are listed in Table 4-2 for the five monitoring locations. The monitoring locations are listed in order from downstream to upstream.

The Coonamessett River discharge data shown in Figure 4-2 show a decreasing amount of discharge from 1998 through 1999 for all five locations, and the average discharges shown confirm this observation. Linear regression analyses applied to these river discharge data indicate that river discharges have declined from 1997 through 1999 at all five measurement stations. This decline in discharge could be due to the decrease in precipitation that is apparent at least for 1999.

Pumping at 750 gpm, the shallow and deep groundwater extraction systems contribute approximately 1.7 cfs to flow in Coonamessett River. During the summer of 1999, this 1.7 cfs was almost the entire river flow at location 69SW0010 since the two upstream locations (69SW0006 and 69SW0058) were reported as having low water levels and/or no water flow (Table 3-3).

It is not readily apparent if pumping from the shallow and deep groundwater extraction systems had any effect on downstream discharge rates at location 69SW0049 because of the complexities of the hydrologic system. Pumping of deep groundwater could reduce

the natural downstream groundwater recharge to Coonamessett River. However the pumped shallow and deep groundwater is returned to the river channel upstream of location 69SW0049. The discharge system was designed such that the effluent is discharged to the river in the part of the river that was receiving the greatest contribution of groundwater, based on pre-operational data. The impacts of groundwater extraction on river flow cannot be determined because the river system is highly variable and largely controlled by other factors, including precipitation, evapotranspiration, human control (using weirs, culverts, ditches, etc) over surface water flows for the purpose of bog operations and managing fish migration, and groundwater extraction and re-introduction through spray irrigation.

#### **4.1.3 Groundwater Elevation Data**

Groundwater levels were measured monthly from January through December 1999 in up to 39 piezometers and wells. These data are shown in Table 4-3 grouped by well cluster where applicable. The midscreen elevation for each location is typically shown and some locations were given a screen designator (T = top screen, M = middle screen, and B = bottom screen) if they were used in vertical gradient calculations. Figures 4-3 through 4-8 are water table maps for January, March, May, July, September, and December 1999. The water table maps are useful to observe two-dimensional groundwater flow patterns, especially near the extraction wells, river, and bogs. The water table maps were created using shallow well screen data, where available, in order to focus on potential hydraulic impacts to surface features like Wetland 1285 and Vernal Pool 390. Groundwater elevation as a function of time is plotted in Figures 4-9 through 4-16 for most of the 39 piezometers and wells. These figures are useful to observe groundwater elevation trends. Figures 4-17 through 4-19 present vertical groundwater gradients in the well clusters. Vertical gradients were calculated using the convention of subtracting the shallow from the deep groundwater elevations. Negative gradients therefore correlate with downward flow between well screen elevations. Figures 4-20 through 4-27 show linear regression analyses of the vertical gradient data that make it easier to visualize potential vertical gradient data trends.

The groundwater elevation and hydraulic gradient data trends are summarized in Table 4-3b. Monitoring locations are listed north to south, and within each well cluster the locations are listed from shallowest to deepest well screen.

It is likely that the groundwater elevation increases in July were the delayed response (or remnant of the response) from the June and July flooding of the bogs to prevent cranberry crop formation. Vertical groundwater gradient data from well cluster 69MW1291 show a gradient reversal from upward to downward flow in July which supports recharge of groundwater from bog flooding.

The January water table map appears to show an expression of groundwater drawdown in the vicinity of deep groundwater extraction well 69EW0001, as expressed by groundwater elevations in 69PZ0111, 69PZ1284A, and 69PZ0112. Vertical gradient data from January in the 69MW1284 well cluster are consistent with the extraction well having an observable zone of groundwater capture. The groundwater elevation maps for March, May, July, September, and December do not show such an obvious drawdown feature. Probably cranberry bog irrigation and flooding activities dominate the extraction well drawdown during the spring, summer, and fall. In fact, cranberry bog irrigation and flooding in the Upper Baptiste Bog appears to have created a slight groundwater mound on the July water table map, as expressed by groundwater elevations in 69PZ0111, 69PZ1284A, 69PZ0113, and 69PZ1303A. The March, July, September, and December groundwater elevation maps also may show an indication of groundwater recharge from the Coonamessett River, as expressed by elevated groundwater elevations in 69PZ1310B, 69PZ0114, and 69PZ1304A or 69PZ0112. Starting with the May groundwater elevation map, there is a slight groundwater drawdown perturbation in the vicinity of the shallow groundwater extraction system, as expressed by groundwater elevations in 69PZ1291A and 69MW1294. This is probably a groundwater drawdown response to the addition of the 84 (of 204) shallow well-points to the shallow groundwater extraction system. Vertical gradient data from well cluster 69MW1291 show upward flow of groundwater toward the shallow groundwater extraction system.

Well clusters 69MW1292, 69MW1293, and 69MW1290 all show upward groundwater flow gradients between the middle and bottom screen intervals and the top and bottom screen intervals. This upward flow is consistent with the FS-28 conceptual model which has groundwater coming to the surface to create the bogs and wetlands and add flow to the Coonamessett River. Well cluster 69MW1285 also shows upward groundwater flow gradients that are enhanced by operation of the shallow groundwater extraction system.

Well clusters 69MW1304, 69MW1284, and 69MW1303 all show downward groundwater flow gradients between the top and bottom screen intervals and the middle and bottom screen intervals. These vertical gradients indicate that the deep groundwater extraction system, and intermittent bog flooding, have reversed that natural upward groundwater flow gradient in this area.

## **4.2 GROUNDWATER CHEMISTRY**

This report presents groundwater data collected under the Ecological Studies Program from July through December 1999 (Appendix A, B). However, all ecological, performance and impact monitoring data collected during January through December 1999 were evaluated in this assessment report (AFCEE 1999c, 1999d, 1999e, 1999g, 1999h, 1999i, 2000c).

### **4.2.1 Chemical Parameters**

EDB is the only analyte included in the chemical groundwater monitoring program for FS-28. The monitoring program for EDB in FS-28 groundwater was comprised of three subcomponents:

- Monthly analysis of pre-treated water from the CWSW and water from three CWSW sentry wells.
- Annual analysis of water from all irrigation wells in the Coonamessett River Valley, biweekly analysis of water from the four irrigation wells and one surface water location located closest to the FS-28 plume, and monthly analysis of water from a sentry well for an irrigation well at Coonamessett Farm.

- Quarterly analysis of water in selected wells upgradient of the deep extraction well, wells between the extraction well and the shallow well-point extraction system, and wells downgradient of the shallow well-point extraction system.

These three components are discussed in the subsections below.

#### **4.2.1.1 Coonamessett Water Supply Well Monitoring**

The pre-treated water from the supply well (69PWS40960) remained nondetect for EDB during 1999. EDB has never been detected in the supply well, which is screened approximately -20 to -30 feet mean sea level (ft msl). The sentry wells 69MW1279A,B, and C are located about 140 feet northeast of the supply well, and are screened from -28.7 to -33.7, -62.8 to -67.8, and -103 to -108 ft msl, respectively. The 69MW1279C well is the only well which is considered to be screened within the FS-28 plume, which underlies the CWSW, although samples from this well have not contained EDB in concentrations greater than 0.02 µg/L, the Massachusetts maximum contaminant level (MMCL), since AFCEE began monthly sampling in 1997. Samples collected from monitoring wells 69MW1279A and B in 1999 did not contain detectable concentrations of EDB. The EDB analytical results for the CWSW pre-treated water and the sentry wells are presented in Table 4-4.

#### **4.2.1.2 Irrigation Water Monitoring**

Irrigation wells 69IG0009 and 69IG0010 are part of the Ashumet Valley monitoring program, and thus were sampled for additional parameters. The field parameters, hardness, and one VOC (an estimated concentration of 22 µg/L of methyl ethyl ketone) in 69IG0010 were the only positive detections in irrigation groundwater in 1999.

Surface water location 69SW0060 represents the irrigation water supply for the Augusta Bog. This location was sampled 17 times in 1999. The only sample that contained detectable EDB (0.02 µg/L) was collected on 22 February 1999.

No EDB was detected in any of the annually-sampled irrigation wells (69IG0005, 69IG0006, 69IG0007, 69IG0008, 69IG0008, 69IG0009, 69IG0010, 69IG0011 and 69IG0013). Irrigation well 69IG0001, sampled at the request of Mr. Handy, was also nondetect. Previously, from the fall of 1996 to the summer of 1997, irrigation water from this well was treated by an on-site granular activated carbon filtration system. EDB concentrations in samples collected from this well between October 1996 and April 1997 ranged from 0.026 to 0.054 µg/L.

All samples collected from the sentry well 69MW1501 for the Coonamessett Farm irrigation well were nondetect for EDB. No EDB was detected in any of the irrigation wells sampled biweekly during the irrigation season (69IG0003, 69IG0004, and 69IG0012).

#### **4.2.1.3 Performance Monitoring**

Nine groundwater monitoring wells (69MW1284A, 69MW1284B, 69MW1285A, 69MW1285B, 69MW1291A, 69MW1291B, 69MW1303A, 69MW1303B, and 69MW1304) were sampled to evaluate the changes in EDB concentrations within and downgradient of the extraction well 69EW0001 capture zone. The EDB concentrations in these wells have been monitored regularly since 1996 (Figure 4-29).

Groundwater from monitoring wells upgradient of extraction well 69EW0001 (69MW1284A, 69MW1284B, and 69MW1304) continues to show concentrations of EDB that exceed the Massachusetts maximum contaminant level (MMCL=0.02 µg/L). In general, the concentrations are decreasing with time because the most contaminated part of the plume has already migrated past these wells. Upgradient concentrations of EDB are less than those near the extraction system.

Monitoring wells 69MW1303A and 69MW1303B, although located south of the extraction well, are within the extraction well's radius of capture. The EDB concentrations in these wells represent the contaminated groundwater that migrates past the extraction well (to the east or west) but is captured by the southern side of the capture

zone. Like the monitoring wells upgradient of the extraction well, the groundwater in these monitoring wells generally shows EDB concentrations decreasing with time.

Monitoring wells downgradient of the extraction well's capture zone (69MW1285A, 69MW1285B, 69MW1291A, and 69MW1291B) are sampled to determine the migration of the leading edge of the plume as it detaches from the capture zone surrounding the extraction well. Additionally, data collected from these wells may determine if part of the plume is escaping capture by the extraction well.

Figure 4-29 shows the historical EDB results from the wells screened along the plume axis. The EDB concentrations in well 69MW1285A and B, which are located immediately upgradient of the shallow well-point extraction system, have dropped somewhat in the past three years. Groundwater at monitoring well 69MW1291B continues to be nondetect for EDB, which is to be expected since this well is screened beneath the plume. EDB was only detected (at 0.012  $\mu\text{g/L}$ ) in samples collected from monitoring well 69MW1291A in 1999. In the later half of the year, no EDB was detected in this well. If EDB concentrations in this area (which historically measured over 2.0  $\mu\text{g/L}$ ) remain nondetect, it may indicate plume detachment resulting from the capture by the upgradient extraction well.

In October 1999, AFCEE modified the quarterly system performance monitoring program for FS-28 to add wells 69MW1317A and 69MW1318A (Figure 3-6 and 3-7) (AFCEE 1999f). These wells had not been sampled previously. Quarterly sampling at 69MW1317A may determine if some of the plume is migrating to the east of the EW-1 capture zone, and should be a good indicator of groundwater conditions approaching the shallow well-point extraction system.

Downgradient of the shallow well-point extraction system, the leading edge of the FS-28 plume is formed as a separate lobe of EDB contamination. The vertical thickness of this separate leading lobe ranges from 10 to 40 feet, and the width narrows from approximately 400 feet to 100 feet along the 900-foot length of this lobe. Monitoring

wells 69MW1318A, 69MW1300B, 69MW1302, and former well 69MW1295 are screened in this lobe (Figure 3-6 and 3-7).

Quarterly monitoring at 69MW1318 will determine how this detached lobe is migrating downgradient. In October 1999, AFCEE also agreed to add 69MW1295 to the quarterly monitoring program because this well is screened in the detached and uncaptured portion of the plume located downgradient of the shallow well-point extraction system. Unfortunately this well has apparently been destroyed. The surveyed coordinates for monitoring well 69MW1295 were marked by a professional land surveyor, and this area was excavated. The well was not found.

Monitoring wells 69MW1286, 69MW1306A, 69MW1306B, 69MW1308, and 69MW1309 were nondetect for EDB during sampling rounds in 1999 and previous rounds since 1996. Monitoring well 69MW1302, which contained EDB concentrations ranging from 0.022  $\mu\text{g/L}$  to 0.1  $\mu\text{g/L}$  in 1999, represents the leading edge of the FS-28 plume. Prior to December 1998, the leading edge was represented by monitoring well 69MW1300B. Concentrations of EDB in 69MW1300B ranged from 0.062  $\mu\text{g/L}$  to 0.185  $\mu\text{g/L}$  in 1999. In the September 1999 sample from 69MW1300A, EDB was detected at 0.033  $\mu\text{g/L}$ . Out of nine sampling rounds since 1996, this is the third round where EDB has been detected in this well (Figure 4-29).

#### **4.2.2 Physicochemical Parameters**

Physicochemical parameters measured in monitoring wells include field parameters (temperature, pH, specific conductivity, dissolved oxygen, oxidation-reduction potential, and turbidity), alkalinity, and nutrients (nitrogen, phosphorus, and organic carbon). Field parameters are tabulated by well and date in Table 4-5, and alkalinity and nutrients are tabulated by well and date in Table 4-6. With the exception of pH, the observed values for these parameters are typical of groundwater on western Cape Cod (AFCEE 1997a). Observed pH values are slightly more acidic than is typical, and may have been derived from biodegradation of spilled fuel in the source area.

#### **4.2.2.1 Field Parameters in Groundwater Monitoring Wells**

The ensuing discussion includes monitoring wells that were sampled at monthly intervals throughout the reporting period (“long-term”), and monitoring wells that were sampled three times between May and September (“summer” wells). The six long-term monitoring wells (69MW1297A, B, C; 69MW1304, 69MW1310, 69MW1501) are located between the western arm of Coonamessett Pond and the deep extraction well (69EW0001), and were sampled for field parameters. Midscreen elevations of these long-term monitoring wells range from -27.1 to -202.2 ft msl. Two of these wells (69MW1304 and 69MW1310) were sampled monthly for alkalinity and nutrients. Sixteen summer wells were also sampled for field parameters. Four are located near the deep extraction well (69MW1284A, B; 69MW1303A, B) with midscreen elevations of -174.3 to -215.9 ft msl; four are near the shallow well-point system (69MW1285A, B; 69MW1291A, B) with midscreen elevations of -34.4 to -154.3 ft msl; and eight are near the leading edge of the FS-28 plume (69MW1286, 69MW1300A, B; 69MW1302, 69MW1306A, B; 69MW1308, 69MW1309) with midscreen elevations of -1.3 to 181.8 ft msl. Groundwater flow in this area, as inferred by the plume outline (Figure 4-29) is slightly upward, rising approximately four to five feet with every 100 feet in the downgradient (southerly) direction. Well locations are depicted in Figure 3-6 and Figure 3-7, and midscreen elevations are listed in Table 4-3.

#### **Temperature**

Observed temperatures ranged from a low of 10.4 °C in 69MW1310 at -202.2 ft msl on 23 February 1999 to a high of 17.2 °C in 69MW1501 at -27.6 ft msl on 17 August 1999. In five of the long-term wells, there is a seasonal warming of 1 to 3 °C peaking from the end of July through September. The sixth (69MW1501) and shallowest well exhibited more extreme warming of 5 °C. The summer wells showed warming of up to 2 °C between May and August or September, with temperatures and trends indistinguishable from those of the long-term wells. There is no significant difference in temperatures or trends between those wells at the leading edge of the plume where groundwater is upwelling and wells upgradient in the body of the plume.

## **pH**

Measured pH values in the six long-term monitoring wells were consistent throughout the monitoring period, varying up to approximately  $\pm 0.25$  pH units. An unusually low value of 4.53 in 69MW1304 on 26 May 1999 is discounted as an instrument anomaly. Average pH values in these wells range from approximately 5.0 in 69MW1279A to 6.1 in 69MW1279C, 69MW1304, and 69MW1310. These values are slightly more acidic than is typically observed in groundwater from western Cape Cod (AFCEE 1997a), probably reflecting elevated carbon dioxide levels derived from biodegradation of fuel spilled in the upgradient FS-28 source area. In the summer wells, pH values are erratic, ranging from 6.84 in 69MW1306B to 3.44 in 69MW1308. In many of these wells, one of the three values differs from the others by up to almost 3 pH units. Such wide variations are unlikely to be real, and are tentatively regarded as instrumental anomalies. Disregarding the anomalous values, the remaining values are generally consistent at each well, and fall within the range observed for the long-term wells.

## **Dissolved Oxygen**

In the long-term wells, average dissolved oxygen ranged from approximately 1 mg/L in 69MW1501 to 8 to 9 mg/L in 69MW1279A, B, and 69MW1310. The summer wells showed a similar range. The low end of this range corresponds to nearly anaerobic conditions, whereas the high values represent highly oxygenated groundwater close to air-saturation. Dissolved oxygen values appear to depend on local lithology; there is no apparent correlation with depth or position with respect to the plume or the extraction well. The range of values seen here is typical of groundwater on western Cape Cod (AFCEE 1997a). The range within a given well is more likely a reflection of the precision of the measurement process; however, because dissolved oxygen should change only slowly from one sampling to the next. Observed sample-to-sample variations in an individual well suggest that measurement precision is on the order of  $\pm 1$  mg/L.

## **Oxidation-Reduction Potential**

Oxidation-reduction potentials range from -84 mV in 69MW1306B on 10 May 1999 to 460 mV in 69MW1306A on 13 July 1999. The observed values indicate generally oxidizing conditions, and are roughly correlated with dissolved oxygen. However, they exhibit little consistency from sample to sample in an individual well. The observed variations suggest that analytical uncertainty is on the order of  $\pm 150$  mV, so that oxidation-reduction potentials are suitable for use only as a general indicator of oxidizing or reducing conditions and should not be construed as a precise measure of redox conditions.

## **Specific Conductivity**

Specific conductivities observed were 101  $\mu\text{S}/\text{cm}$  or lower in all wells except one. This is typical of groundwater on western Cape Cod (AFCEE 1997a). Although there is a perceptible upward trend in the long-term wells, beginning the reporting period with an average near 70  $\mu\text{S}/\text{cm}$  and ending with an average near 80  $\mu\text{S}/\text{cm}$ , there is no correlation with relative position or depth, and thus cannot be interpreted further. In 69MW1306B, all three measurements were slightly higher, near 125  $\mu\text{S}/\text{cm}$ . Although unusual, such values most likely represent the upper end of the natural distribution of conductivity values. In 69MW1308, the measurement on 14 July 1999 of 166  $\mu\text{S}/\text{cm}$  is regarded as an instrument anomaly; it differs greatly from the preceding or subsequent measurements, both of which were near 90  $\mu\text{S}/\text{cm}$ .

## **Turbidity**

Turbidity values in all wells were generally within the range of -0.3 to 6.9 NTU during the reporting period, indicating very low amounts of suspended material in the sampled groundwater. Negative values are physically impossible, but provide an indication of the precision of the measurement. Thus, the variability of at least  $\pm 0.3$  NTU appears to be inherent in these determinations.

#### **4.2.2.2 Field Parameters in Irrigation Wells**

Field parameters were measured one to seven times in 12 irrigation wells, as listed at the end of Table 4-5. These wells are distributed along the Coonamessett River, from just above the confluence with Broad River to a point one and a half miles downstream where cranberry bogs give way to estuarine conditions. One well is within the FS-28 plume outline (69IG0001), and three wells are adjacent to the leading edge (69IG0003, 69IG0004, and 69IG0012).

Temperatures measured in the irrigation wells ranged from 10.66 to 15.37 °C, like the range observed in the groundwater monitoring wells. pH values ranged from 5.48 to 8.42. The high value is unusual, and may represent an instrumental anomaly. However, several other values also exceeded the highest pH observed in the groundwater monitoring wells (6.84). The origin of these elevated values is unknown at this time. Dissolved oxygen levels ranged from 5.21 to 11.31 mg/L, except for the irrigation well within the plume outline (69IG0001), which had a very low level of 0.12 mg/L. These levels are consistent with those observed in the groundwater monitoring wells. Oxidation-reduction potentials (14 to 484 mV) are also similar to those observed in groundwater. Specific conductivities ranged up to 110 µS/cm, as observed in groundwater; several values less than approximately 50 µS/cm are implausibly low and most likely represent instrumental anomalies. Turbidity was less than 3.3 NTU in all but two wells, which were probably disturbed by the sampling process.

#### **4.2.2.3 Alkalinity and Nutrients in Groundwater Monitoring Wells**

Alkalinity and nutrient values, presented in Table 4-6, were measured in only two wells, both located upgradient of the deep extraction well and within the FS-28 plume. There was little variation from month to month in these parameters, so the following discussion will focus on averages. For all parameters, concentrations were low, reflecting the high quality of groundwater typical of western Cape Cod (AFCEE 1997a).

Concentrations were nearly identical in both wells for most parameters. Alkalinity was near 18 mg/L, total organic carbon was near 0.25 mg/L, dissolved organic carbon was near 0.85 mg/L, ammonia was generally nondetect, total phosphorus was near 38 µg/L, and total phosphate (as phosphorus) was near 35 µg/L. The greater value of dissolved organic carbon relative to total organic carbon is the result of a bias in the analytical equipment used in these determinations. These values remain useful indicators of variations in organic carbon, although there were no significant variations in these wells during the reporting period.

The two wells differed by about a factor of two for total nitrogen, nitrate, and nitrite; the upgradient well (69MW1310) was higher for total nitrogen and nitrate. Total nitrogen averaged 138 or 312 µg/L, nitrate-nitrogen averaged 130 or 297 µg/L, and nitrite-nitrogen averaged 0.63 or 0.30 µg/L. Such values are far below the MMCL for nitrate of 10 mg/L (DEP 1998).

### **4.3 SURFACE WATER CHEMISTRY**

This report presents surface water data collected under the Ecological Studies Program from July through December 1999 (Appendix A, B). However, all ecological, performance and impact monitoring data collected during January through December 1999 were evaluated in this assessment report (AFCEE 1999c, 1999d, 1999e, 1999g, 1999h, 1999i, 2000c).

#### **4.3.1 Chemical Parameters**

No volatile organic compounds (VOCs) were detected in Coonamessett River surface water samples collected from locations, 69SW0024, 69SW0049, and 69SW2008 (AFCEE 1999e).

During the reporting period, EDB was detected at nine of 25 surface water sample locations on the Coonamessett River, associated cranberry bogs, and Broad River (Table 4-7). The EDB concentration measured in surface water samples ranged from 0.006J (estimated concentration) to 0.051 µg/L. Figure 4-30 depicts surface water EDB

concentrations increasing from early January to March at many locations. The EDB concentrations for January were more than likely either the result of dilution (through mixing and volatilization) of upwelling groundwater or decreases in the volume of upwelling groundwater due to the flooded condition of the bogs in January.

The maximum concentration of EDB detected in 1999 surface water samples (0.051 µg/L) was less than the action level (0.5 µg/L) for air monitoring. As a result, AFCEE did not collect any air samples in the bogs as part of the risk monitoring program in 1999. Since the concentrations of EDB have dropped to below detectable levels, it is anticipated that no air monitoring will need to be conducted in the future.

EDB was not detected in surface water samples collected after 03 May 1999 (Figure 4-30). The data indicate that the treatment system and berm separation project were successful in eliminating EDB from the Coonamessett River, associated cranberry bogs, and Broad River.

Because the river had not been free of detectable EDB for a year (prior to May), the autumn 1999 cranberry crop from bogs along the Coonamessett River was assumed not to be marketable. Because the cranberry growers did not want to harvest an unmarketable cranberry crop, the potentially affected bogs were flooded at various stages between mid-June and early July to suppress blossoming and ultimately, the production of cranberries on the vines. The growers were successful at preventing the fruit production, and the potentially affected bogs on the Coonamessett River were not harvested in 1999.

Because AFCEE anticipates that there will have been one year of clean river water in and around the Coonamessett River bogs by the time the 2000 cranberry crop starts blossoming, AFCEE anticipates that the autumn 2000 crop will be marketed.

### **4.3.2 Physicochemical Parameters**

#### **Temperature**

The temperature of the Coonamessett River was influenced by seasonal variations in ambient air temperature, the influx of groundwater, and the manipulation of water levels associated with cranberry growing activities (e.g., flooding the bogs). During 1999, the temperature of the river ranged from approximately 2°C (69SW0006, March 1999) to 25.8°C (69SW2008, July 1999) (Table 4-8). The temperature of the treatment system effluent did not display the seasonal variation that was measured in the river. During the reporting period the mean temperature of the effluent was 12.14±0.53°C. A comparison of temperature measurements from locations 69SW0006 (upstream of the treatment system discharge) and 69SW0065 (immediately downstream of the treatment system discharge) indicate that the treatment plant discharge warmed the river during November through April and cooled the river from May through October (Table 4-8). Differences in the temperature of the river measured at locations 69SW0006 and 69SW0065 ranged from -11.8 to 3.7°C.

In December the temperature measured at location 69SW0065 was 3.7°C warmer than 69SW0006 (Table 4-8, Figure 4-31). The temperature difference exceeded the Commonwealth of Massachusetts surface water quality standard stated in 3.14 CMR 4.05 (rise in temperature of less than 2.8°C) (DEP 1998). However, during December, the temperature of the river continued to increase downstream at location 69SW0010. The downstream temperature remained elevated all the way to location 69SW0049. The elevated temperatures of the river at locations 69SW0010 through 69SW0049 were likely the result of the influx of warmer groundwater. Therefore, the temperature exceedance at location 69SW0065 did not significantly impact the ecology of the Coonamessett River.

#### **Dissolved Oxygen**

The mean dissolved oxygen (DO) concentrations measured in the Coonamessett River remained above 7.9 mg/L during the reporting period (Table 4-8, Figure 4-31). During the reporting period, the monthly mean DO concentration measured at location

69SW0065 ranged from 6.99 to 10.85 mg/L. Hourly DO measurements collected from location 69SW0065 remained above 5 mg/L with the following exceptions:

- 04 through 05 March, the DO probe appeared to have failed beginning at 2200 hours.
- 23 April, low DO concentrations were recorded at 1100 and 1200 hours; at 1300 hours the DO concentration returned to near saturation. It appears the flow across the YSI probes was blocked, possibly by a piece of plant material.
- 12 May, low DO concentrations were measured after the activation of the irrigation system to the E3 bog that interrupted the flow to the bubbler.
- 25 May, a low DO concentration was recorded at 0300 hours. This measurement appears to be anomalous since the measurements collected at 0200 and 0400 hours were approximately 7.4 mg/L.
- 29 June, low DO concentration was measured at 1100 hours. The YSI probe appears to have been removed from the river; the temperature increased approximately 7°C at the time of the low DO measurement to 19°C.
- 02 July, low DO concentrations coincided with the treatment plant being off-line.
- 04 July, low DO concentrations coincided with the treatment plant being off-line.
- 26 July, low DO concentrations coincided with the treatment plant being off-line.
- 20 August, low DO concentrations coincided with the treatment plant being off-line.
- 24 August, low DO concentrations coincided with the treatment plant being off-line.
- 09 September, low DO concentrations coincided with the treatment plant being off-line.
- 05 October, low DO concentrations coincided with the treatment plant being off-line.
- 08 October, low DO concentrations coincided with the treatment plant being off-line.
- 14 October, low DO concentrations coincided with the treatment plant being off-line.
- 31 October, DO concentrations measured between 0400 and 0700 hours ranged from 4.6 to 4.9 mg/L.
- 20 December, low DO concentrations coincided with the treatment plant being off-line.

These data demonstrate that the treatment system discharge meets the criteria for surface water discharge as stated in 3.14 CMR 4.05 (DO concentration shall not be less than 5.0 mg/L in warm water fisheries) (DEP 1998).

## **pH**

The pH of the Coonamessett River ranged from 5.72 to 8.50 during the reporting period (Table 4-8). During the reporting period, the pH measured at location 69SW0065 was equal to or greater than 6.5 in April, June, August, October, and December. The pH measured at many of the Coonamessett River sample locations was below 6.5 during the reporting period. With the exception of February, monthly pH measured at location 69SW0065 was within 0.5 pH units of the monthly mean pH of the Coonamessett River. The monthly mean pH calculated for the Coonamessett River excluded measurements from location 69SW0065. The difference of the February pH measured at location 69SW0065 and the mean pH of the Coonamessett River was 0.57. However, the difference in the pH measured at location 69SW0065 and 69SW0006 (immediately upstream of 69SW0065) was 0.08 pH units.

Commonwealth of Massachusetts regulation 3.14 CMR 4.05 states that the pH for surface water shall be in the range of 6.5 through 8.3 standard units and not more than 0.5 units outside of background range (DEP 1998). Therefore, pH data collected during the reporting period indicate there were no significant ecological impacts relative to pH due to the treatment system discharge.

## **Specific Conductivity**

The specific conductivity of Coonamessett River surface water ranged from 28 to 253  $\mu\text{S}/\text{cm}$  during the reporting period (Table 4-8).

## **Oxidation-Reduction Potential**

The ORP data indicate the Coonamessett River was toxic during the reporting period, except for samples collected in June downstream of location 69SW0046 (Table 4-8). The ORP data collected in June, downstream of location 69SW0046, were inconsistent with the DO data. The DO concentration at these locations was at or near saturation with respect to temperature. It is not possible to have high levels of DO and reducing conditions. Therefore, the ORP data collected in June downstream of location 69SW0046 was considered suspect.

## **Turbidity**

The turbidity data show no trend for surface water sample locations within or between sampling rounds. The mean ranged from 1.6 to 13 nephelometric turbidity units (NTUs)(Table 4-8). Surface water runoff, precipitation, and agricultural activities influence turbidity levels in the Coonamessett River.

## **Alkalinity and Nutrients**

Chlorophyll-*a* concentrations indicate greater primary production upstream of the treatment system discharge (location 69SW0006) verses immediately downstream (location 69SW0065) (AFCEE 1999d, Appendix B). Location 69SW0006 contained higher concentrations of ammonia, nitrite, total nitrogen, and total organic carbon than 69SW0065. The ortho-phosphate and total phosphorus concentrations were higher at location 69SW0006 than 69SW0065 during August and November. During March and May the ortho-phosphate and total phosphorus concentrations were greater at location 69SW0065 than 69SW0006. The alkalinity data indicate no significant difference between the Coonamessett River upstream of the treatment system discharge (69SW0006) and immediately downstream (69SW0065). The data indicate the treatment system is removing nitrogen and phosphorus from the treated groundwater. The treatment system discharge is improving the water quality of the Coonamessett River by decreasing the nitrogen loading throughout the year and the phosphorus loading during the summer and fall.

### **4.3.3 Ecological Impacts**

The data evaluated during the reporting period indicate there were no significant ecological impacts associated with the FS-28 plume or the operation of the groundwater treatment system. The groundwater treatment system appears to be improving the water quality of the Coonamessett River through: (1) decreases in the nitrogen loading, (2) decreases in the summer and fall phosphorus loading, and (3) the elimination of EDB from the river.

## **4.4 TREATMENT SYSTEM**

This section discusses the operational characteristics of the treatment system from January through December 1999. Additionally, at the request of DEP, air monitoring of the treatment system that was conducted during January 2000 has been included in Section 4.4.2.

### **4.4.1 Treatment System Operations**

The FS-28 treatment system was modified significantly in 1999. On 06 April 1999 the shallow well-point extraction system was brought on-line (Figure 2-4). Prior to the addition of the shallow well-point influent, the deep extraction well pumped contaminated groundwater to the treatment system at a rate of approximately 600 gpm. The shallow well-point extraction system was incorporated into the treatment system at a flow rate of 350 gpm. After 06 April 1999, the deep extraction well flow rate was reduced to 400 gpm. The two influent sources are combined for a total flow rate of 750 gpm of EDB-contaminated groundwater.

The FS-28 treatment facility ran without interruption, treating groundwater from the deep extraction well (69EW0001) except for the following exceptions:

- Foul weather caused a power outage on 25 February 1999 and kept the system off-line for 43 hours.
- During the installation and hook-up of the shallow well-point extraction system, the treatment plant was shut down intentionally to accommodate the new construction.
- April 1999, five gallons of fuel oil were released.
- During May and June, a series of thunderstorms caused the system to shut down on two separate occasions for approximately eight hours each.
- On 15 May 1999, a severe thunderstorm caused the FS-28 system to shut down. When the plant shut down, a pressure valve failed, which caused the release of approximately 1,000 gallons of EDB-tainted water out of the pumphouse for the shallow well-point extraction system. Conservative calculations indicated that the amount of EDB spilled was not a reportable quantity. Further soil testing indicated that EDB was not detected in the potentially impacted soil.
- September 1999, 40 gallons of treated water were released.

- On 16 September 1999, the plant was taken off-line in preparation for Hurricane Floyd.
- The treatment plant was off-line for approximately 120 hours during the month of October due to severe weather conditions.
- The deep extraction well pump became ineffective on 15 October 1999. The pump was off-line until replaced. The deep extraction well was off-line for 229 hours (9.5 days).
- November 1999, interruption to the operation of the treatment system due to severe weather.
- November 1999, the treatment plant effluent line was damaged when a local bog worker attempted to irrigate the bog with plant effluent. The line was replaced and valves were installed to prevent a reoccurrence of the problem.
- November 1999, the shallow well-point surge tank overflowed.
- December 1999, interruption to the shallow well-point extraction system due to a pump malfunction.
- December 1999, effluent pipeline leak.

The treatment plant monitoring data are presented in Table 4-9 and Appendix D. Treatment system data was presented to regulatory agencies at the weekly technical update meetings. In addition, data submittals have been sent out monthly to meet the requirements of the NPDES permit exclusion.

Approximately 16 million gallons of water were treated in 1999. It is estimated that 0.9 kg (2 lbs) of EDB were removed during this time period. At the end of 1999, approximately 2.4 kg (5.4 lbs) of EDB (about 20 percent of the EDB mass in the plume) had been removed since the system began operation in 1997.

#### **4.4.2 Treatment System Air Monitoring**

A June 1999 grab sample of air collected directly from the vent from the surge tank (in the pump house for the shallow well-point extraction system) contained measurable concentrations of EDB. Other samples collected in the breathing zone inside and outside of the pump house did not contain measurable concentrations of EDB. On 07 January 2000, AFCEE conducted additional air and water sampling to ascertain whether the

passively vented surge tank in the pump house could be a source of EDB vapors, and if so, whether those EDB concentrations posed unacceptable risks to human health.

To determine how much, if any, EDB was being volatilized in the surge tank, AFCEE measured the EDB concentrations in the water entering and leaving the surge tank. Over an eight-hour period on 7 January 2000, six samples were collected at each location. The water data indicate that the average EDB concentration entering the tank (0.376 µg/L) is essentially the same as the average concentration leaving the tank (0.379 µg/L) (AFCEE 2000c). AFCEE also collected 8-hour time-weighted air samples in the breathing zone 15 feet north of the pump house building (69PLT01017) and approximately 100 feet west of the pump house building (69PLT01022). Background air samples were also collected at vernal pools 2 and 7 (ECAAVP201, ECAAVP701, and ECAAVP0701-FD). All of the air samples were analyzed using a modified TO-14 method to analyze for low levels of EDB by programming a gas chromatograph/mass spectrometer (GC/MS) in a selective ion monitoring (SIM) mode. All four primary samples, the duplicate, and the lab blank were nondetect for EDB, with detection limits ranging from 5.7 to 7.2 nanograms per cubic meter (ng/m<sup>3</sup>) (AFCEE 2000c). Based on the results of the water and air sampling in and around the pump house, AFCEE believes that there is no significant risk to human health from the emission of EDB vapors from the pump house.

## 5.0 RISK MANAGEMENT

Maximum detected concentrations of EDB from the Coonamessett River and associated cranberry bogs surface water samples were compared against ecological benchmarks and human health screening criteria (Appendix C). The results of the ecological screening indicated ecological benchmarks were not exceeded during the reporting period (Table 5-1). The preliminary screening-level human health risk evaluation indicated that no risk- or hazard-based concentrations were exceeded during the reporting period.

Groundwater within the plume upgradient of the extraction systems still remains above the Massachusetts MCL of 0.02 µg/L, with the highest concentrations detected (7.75 µg/L at 69MW1284A) at the location closest to the deep extraction well, 69EW0001. Groundwater concentrations of EDB exceeding the Massachusetts MCL have also been measured in the uncaptured part of the leading lobe of the FS-28 plume. The highest concentration of EDB measured in 1999 samples collected at the leading edge was 0.185 µg/L.

Maximum detected concentrations of analytes from the treatment plant effluent were compared to ecological benchmarks and human health screening criteria (Appendix C). The results of the ecological screening indicated ecological benchmarks were exceeded for two metals, barium and zinc, during the reporting period (Table 5-1). The preliminary screening-level human health risk evaluation indicated that no risk- or hazard-based concentrations were exceeded during the reporting period.

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## 6.0 CONCLUSIONS AND RECOMMENDATIONS

### 6.1 SITE HYDROLOGY

Coonamessett River discharge measurements from 1999 are consistent with the FS-28 conceptual model, which has the Coonamessett River gaining no water (and sometimes losing water) for the first 3000 feet or so after its origin at Coonamessett Pond. The river gains a significant amount of flow from groundwater discharge once the river crosses Hatchville Road and enters the cranberry bogs. Unlike the past two years, the upper reach of the Coonamessett River was dry for several months in 1999, an obvious indication of this area's sensitivity to the lower level of water in Coonamessett Pond and the regionally low groundwater levels resulting from a long period of relatively light precipitation. Additional factors such as continued groundwater extraction from Falmouth's Coonamessett Water Supply Well near the upper reach of the Coonamessett River and the reduced extraction rate from AFCEE's deep extraction well to accommodate treatment of water from the shallow well-point extraction system, which became operational in 1999, complicate the interpretation of local hydrologic observations.

In general, groundwater elevations decreased by 1 to 1.5 ft during 1999 with short-term groundwater elevation increases in April, July, and September. This trend is also observable on the water table maps that show the same groundwater elevation contours migrating northward, as the year progressed, especially south of the extraction well 69EW0001. These trends are generally consistent from monitoring location to monitoring location, although none of the monitoring locations are entirely outside of the influence of the extraction systems and the river, both of which (as discharging systems) serve to buffer the regional climatic effects on groundwater levels. The short-term groundwater elevation increases in April, July, and September are probably due to cranberry bog irrigation and flooding activities. The July increase could be a slightly delayed response to flooding of the Upper Baptiste Bog that occurred in June and early July to kill fireworms and prevent the cranberry crop from developing.

Groundwater elevation data collected in January 1999 show drawdown around the deep groundwater extraction well 69EW0001. However, groundwater elevation data from the other months do not show an obvious zone of groundwater capture. It is likely that cranberry bog irrigation and flooding activities are reducing the zone of groundwater capture around 69EW0001. Vertical groundwater gradient data indicate that there is downward flow in the vicinity of 69EW0001. Downward vertical gradients were seen in well clusters 69MW1304 and 69MW1303, which are 225 and 110 feet from extraction well 69EW0001, respectively.

Groundwater elevation data starting in May 1999 give a subtle indication of drawdown in the vicinity of the shallow groundwater extraction system. The vertical groundwater gradient data indicate that there is upward groundwater flow toward the shallow groundwater extraction system.

The March, July, September, and December groundwater elevation maps show the potential for groundwater recharge from the Coonamessett River. A groundwater elevation ridge runs through locations 69PZ1310B, 69PZ0114, and 69PZ1304A or 69PZ0112. This recharge is consistent with the FS-28 conceptual model where the Coonamessett River is a losing stream above Hatchville Road.

The closest monitoring location to the 1285 Wetland is its namesake, the 69MW1285 well cluster. The data show decreasing groundwater elevations of approximately 0.5 ft from May through December with a temporary increase in July. Although the April 1999 start-up of the adjacent shallow well-point extraction system had an effect, the magnitude of this effect is difficult to quantify because all locations (except 69PZ0114 and 69PZ0115) experienced a decrease in groundwater elevations in 1999. The cause of the July increase in groundwater elevation is also uncertain because most locations also experienced a July increase in groundwater elevation; however, cranberry bog flooding is the most likely cause.

The closest monitoring location to Vernal Pool 390 is 69PZ0115. There were no groundwater elevation measurements taken from June through October at this location;

however, the existing data indicate that there was no groundwater elevation decline in 69PZ0115.

For the hydraulic monitoring program, the following recommendations are offered:

- Include a well cluster in the monitoring program that is not influenced by pumping so that groundwater elevation trends due to changing precipitation can be observed.
- Plan a system shutdown to evaluate the drawdown caused by the current extraction configuration. Continuous groundwater level measurements (and periodic readings of elevation at selected surface water locations) should be collected for about two days prior to system shutdown, during the shutdown (at least 30 hours), and for about two days after the system is restarted. These data should be evaluated to determine the system hydraulic performance and to establish the hydraulic monitoring program.
- Eliminate Wetland 1285 as an ecosystem of concern for the following reasons: (1) The wetland developed on an abandoned cranberry bog which has raised the ground surface three to four feet, (2) the wetland is subject to periodic flooding during the winter months when the Coonamessett River level is raised to flood active cranberry bogs, and (3) the majority of the common vegetative species found in the wetland are also common to moist thickets and upland forest habitats within the region. A detailed summary of vegetative species found in Wetland 1285 is presented in Appendix E.

## 6.2 GROUNDWATER QUALITY

From the chemical monitoring of groundwater, the following is concluded:

- Irrigation water wells surrounding the Coonamessett River and at Coonamessett Farm are providing safe EDB-free water for agricultural use.
- EDB concentrations within the capture zone for the deep extraction well 69EW0001 are still high, meaning that extraction should continue at the current rate.
- EDB concentrations downgradient of 69EW0001, but upgradient of the shallow well-point extraction system (locations 69MW1285A and B and irrigation well 69IG0001), are dropping with time, suggesting plume separation downgradient of the extraction well.
- The EDB concentrations in the uncaptured leading edge of the FS-28 plume are still high enough that continued downgradient migration is expected. However, it is expected that the lobe will continue to converge to a thin, narrow plume, rising slowly in elevation, and eventually discharge to the Coonamessett River several hundred, if not several thousand feet downgradient of the plume's current location. When it does discharge to the river many years from now, it is doubtful that the EDB concentrations will be detectable due to the much larger volume of clean water flowing in the river.

- Field water quality parameters are typical of the region, except for some anomalous values which are suspected to be the result of malfunctioning equipment. Alkalinity and nutrient levels are stable and below drinking water parameters.

For the chemical groundwater monitoring program, the following recommendations are offered:

- Quarterly monitoring of EDB in groundwater should continue at the locations already being monitored.
- EDB is the only contaminant that requires analysis in groundwater.
- Monitoring well 69MW1295 should be replaced and added to the quarterly monitoring program.

### **6.3 SURFACE WATER QUALITY**

The groundwater treatment system and berm separation project was successful in eliminating EDB from the Coonamessett River, associated cranberry bogs, and Broad River. EDB has not been detected in surface water samples since May 1999. Earlier EDB detections in surface waters of the Coonamessett River and associated cranberry bogs made the 1999 cranberry crop unmarketable. Therefore, the cranberry growers flooded the cranberry bogs in June and early July to prevent the vines from producing fruit. With the improvement in surface water quality in 1999, it is expected that the 2000 cranberry crop will be marketed.

The data evaluated during the reporting period indicate there were no significant ecological impacts associated with the FS-28 plume or the operation of the groundwater treatment system. The groundwater treatment system appears to be improving the water quality of the Coonamessett River.

There are no recommendations to modify the current surface water monitoring program.

### **6.4 REMEDIAL SYSTEMS**

Conclusions:

- The treatment plant removed 0.9 kg of EDB from approximately 16 million gallons of contaminated groundwater during 1999.
- The treatment system effectively removes EDB from extracted groundwater to nondetectable levels.
- The treatment system effectively intercepts EDB-contaminated groundwater prior to its upwelling into the Coonamessett River and associated bogs.

#### Recommendations:

- The distribution of EDB in the shallow well-point extraction system should be evaluated. At least 25 of the shallow well-points, distributed evenly throughout the shallow extraction field, should be sampled for EDB analysis. The configuration of the extraction system should be reconsidered after these data are evaluated.
- As the concentration of EDB downgradient of 69EW0001 and upgradient of the shallow well-point extraction system decreases with time, the extraction rate from 69EW0001 should be increased, and the extraction rate from the shallow well-point extraction system should be reduced.

## 6.5 RISK MANAGEMENT

Surface water ecological benchmarks or preliminary screening-level human health risk- or hazard-based concentrations were not exceeded during the reporting period. The treatment plant effluent contained two metals, barium and zinc, which exceeded ecological benchmarks during the reporting period. The preliminary screening-level human health risk evaluation of the treatment plant effluent indicated there was no exceedance of risk- or hazard-based concentrations during the reporting period.

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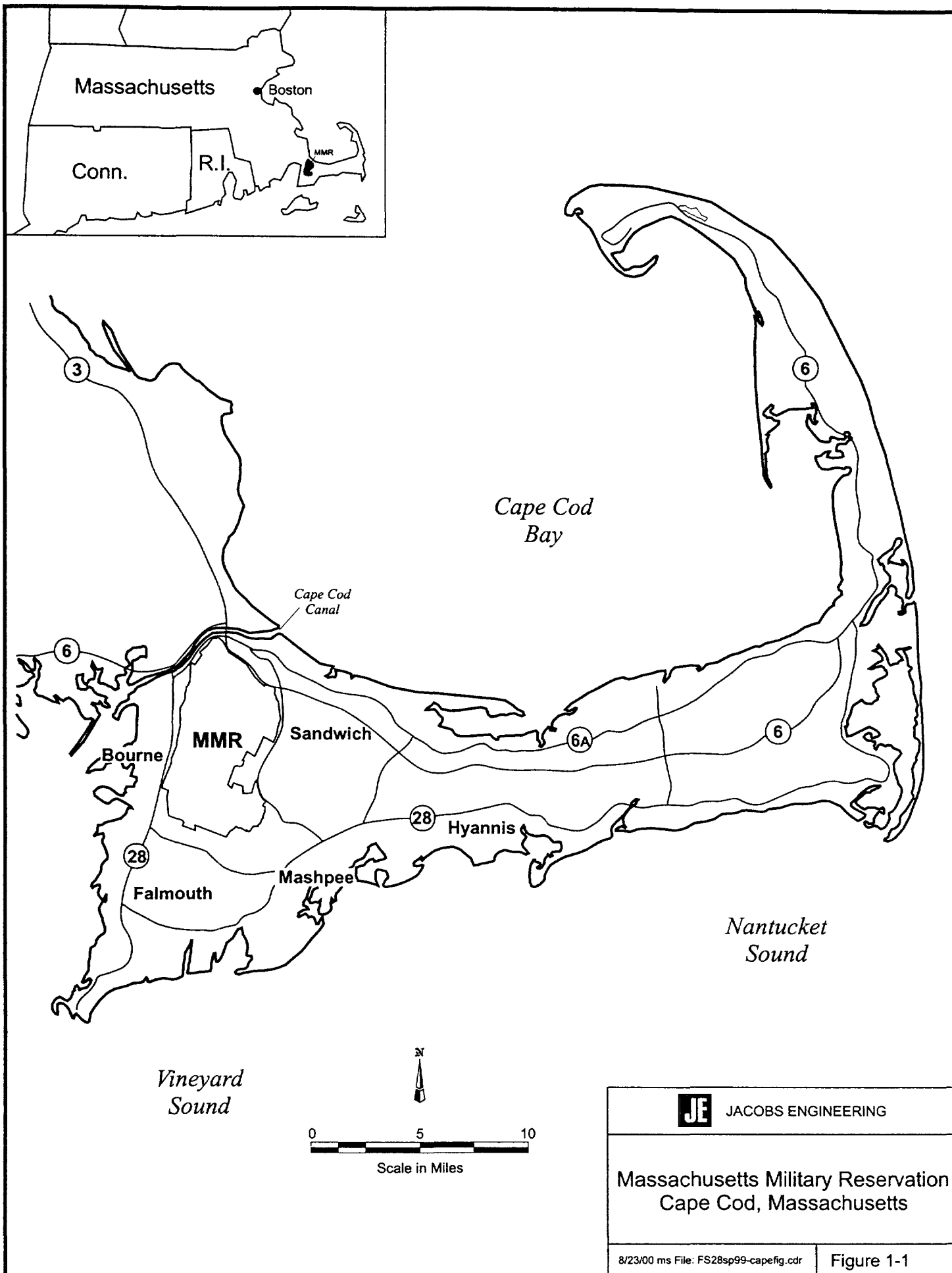
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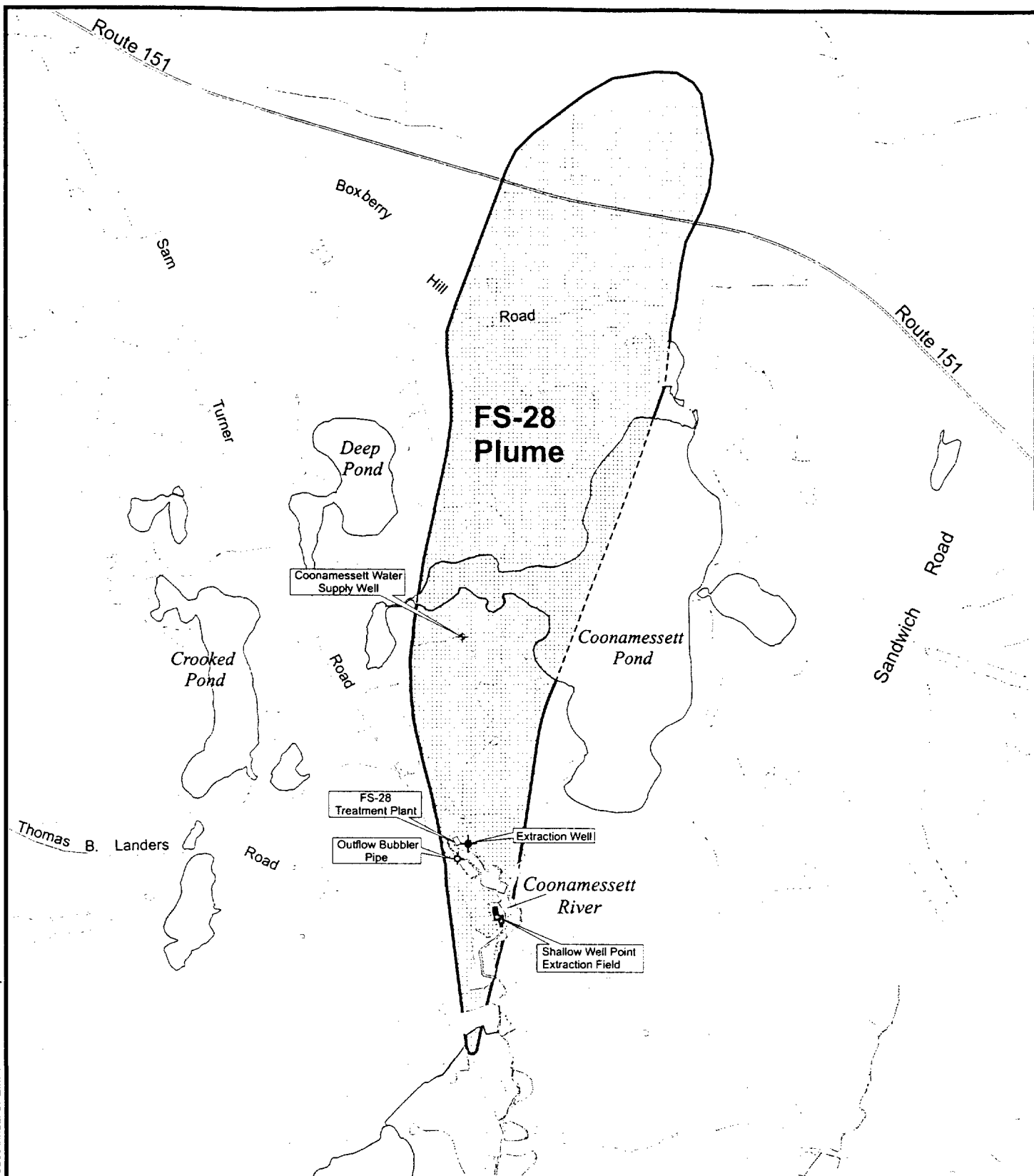
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

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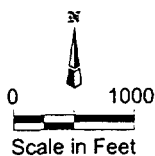
## FIGURES





### Legend

-  Plume Contour  
( EDB MCL = 0.02  $\mu\text{g/L}$  )
-  Plume is under  
Coonamessett Pond  
by 100 feet
-  Bog



Note: Plume underflows pond



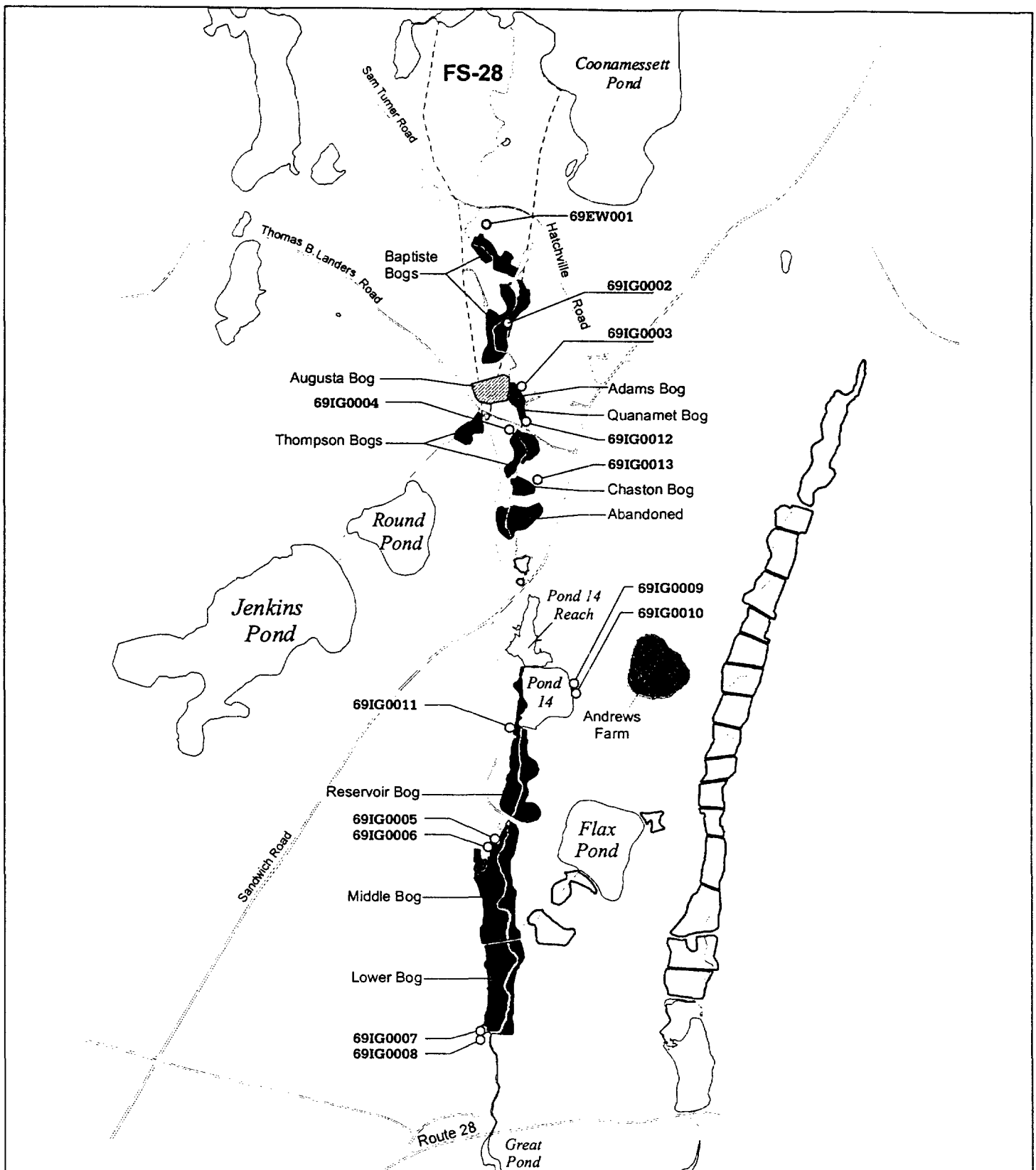
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## FS-28 Plume




Massachusetts Military Reservation  
Cape Cod, Massachusetts

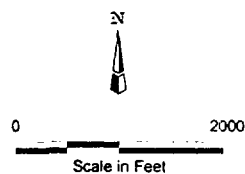
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Figure 1-2



### Legend

-  Cranberry Bog, Surface water supply
-  Cranberry Bog, Groundwater supply
-  Plume Contour (1998 Data)



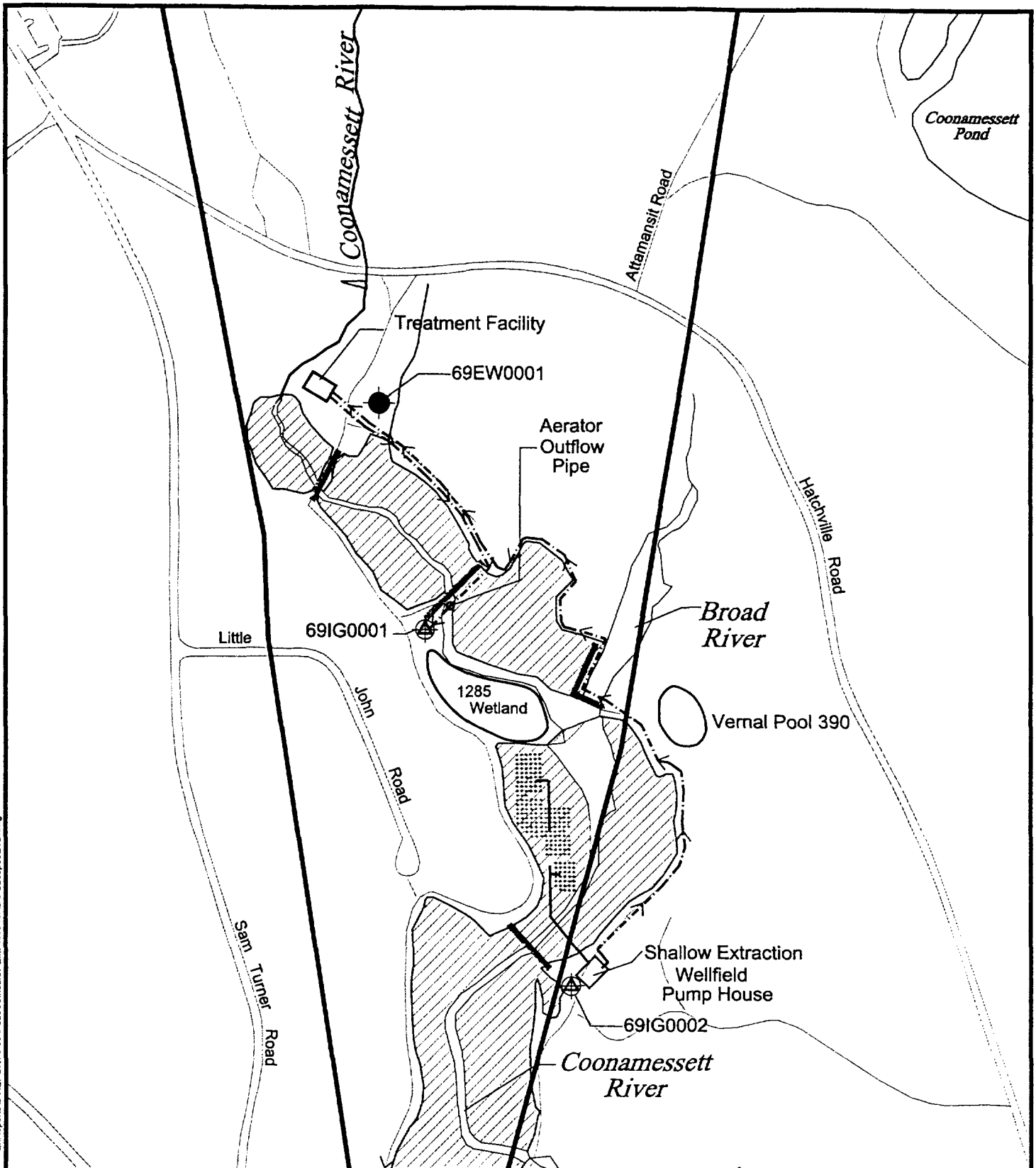
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**FS-28 Plume  
Coonamessett River  
Bog Locations and Irrigation Wells**  
Massachusetts Military Reservation  
Cape Cod, Massachusetts

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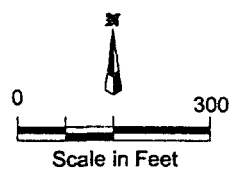
Figure 2-1

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### Legend

- |  |                 |  |                         |
|--|-----------------|--|-------------------------|
|  | Well Points     |  | Bogs                    |
|  | Irrigation Well |  | Pipeline                |
|  | Extraction Well |  | FS-28 Plume (1998 Data) |
|  | Berm            |  |                         |



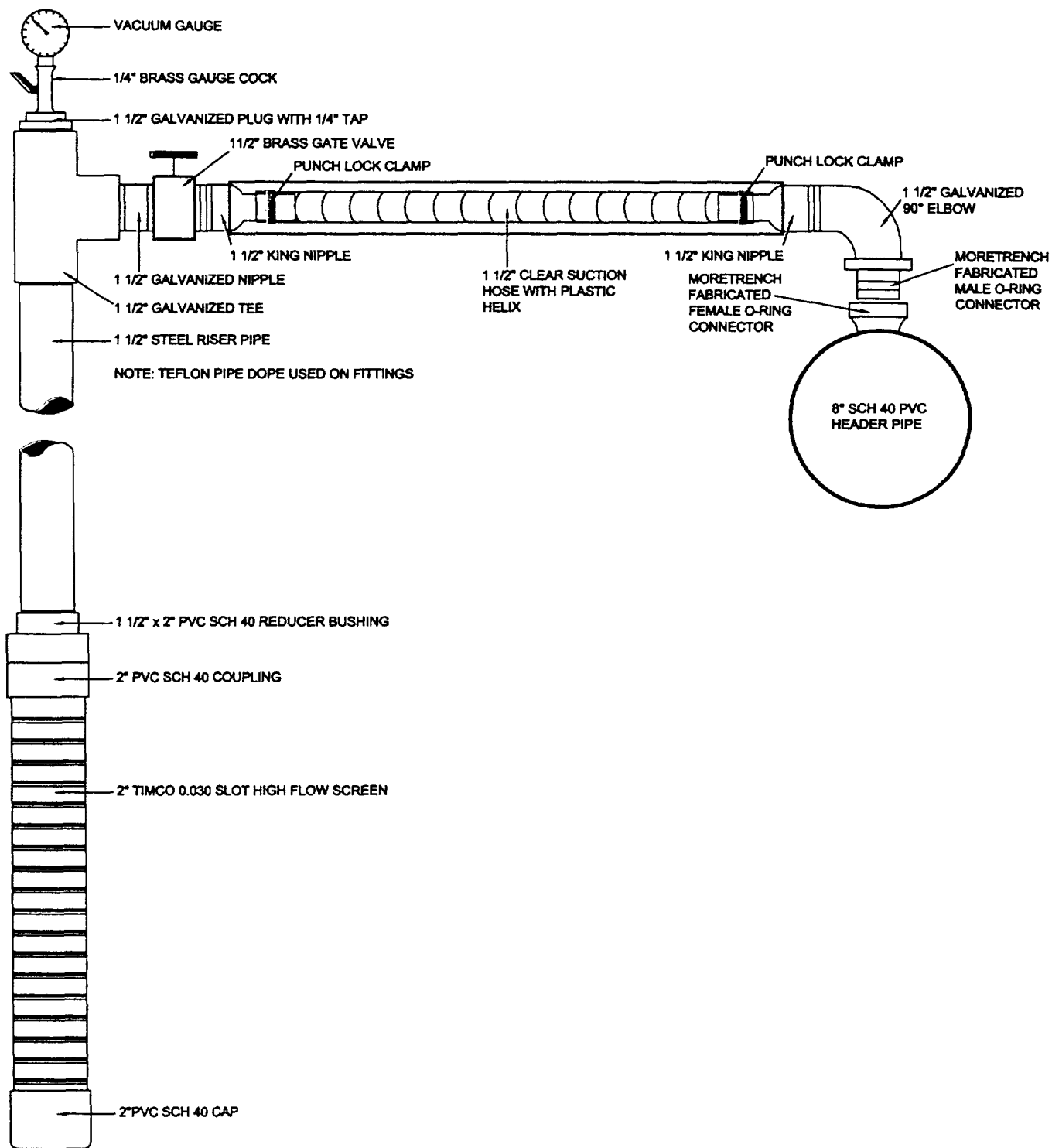
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### FS-28 Extraction, Treatment, and Discharge System

Massachusetts Military Reservation  
Cape Cod, Massachusetts

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Figure 2-2



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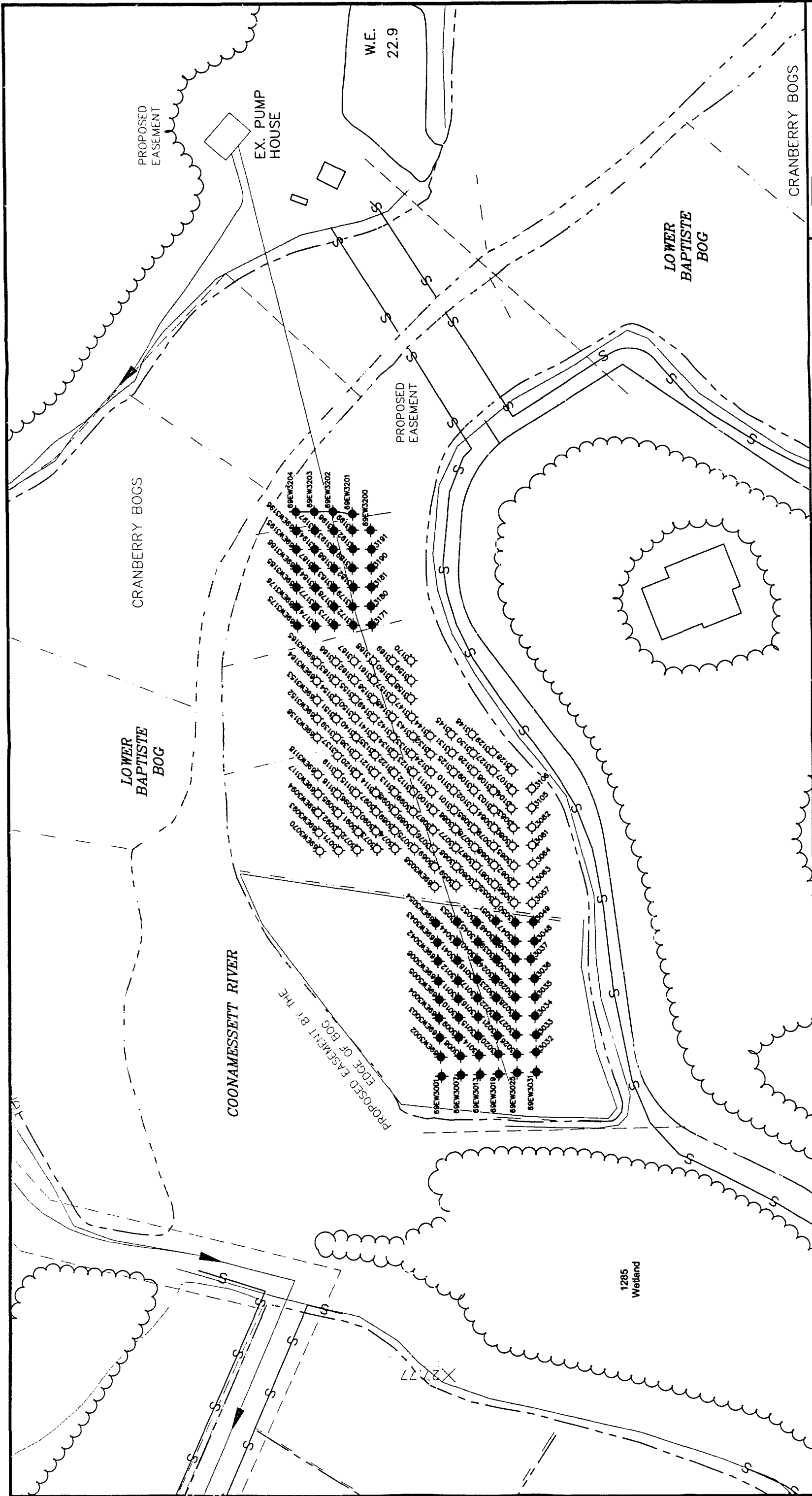
**FS-28**  
**Well-Point Connection**  
**Detail**

Massachusetts Military Reservation  
Cape Cod, Massachusetts

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Figure 2-3

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**Legend**

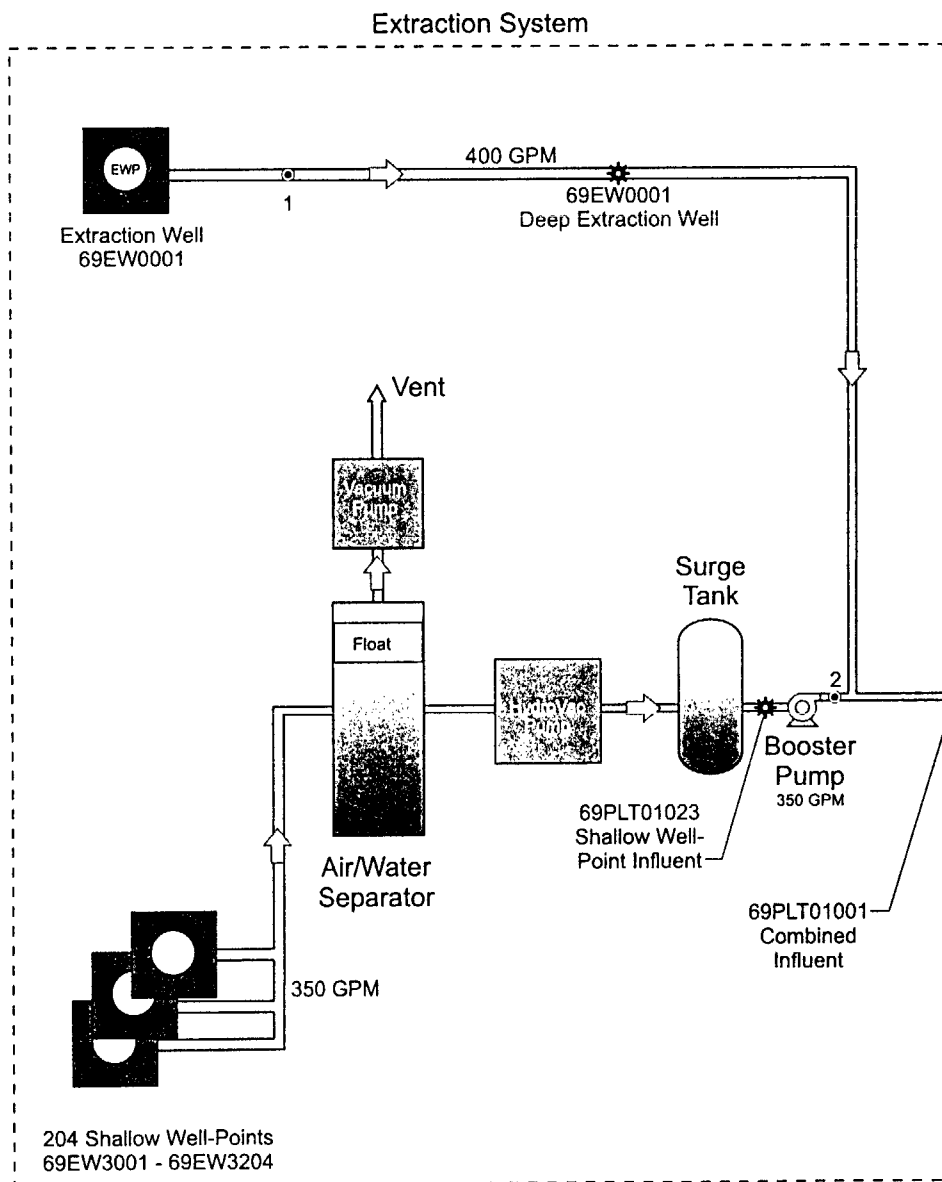
- Shallow Well-Point On
- Shallow Well-Point Off

**JE** JACOBS ENGINEERING

**FS-28 Shallow Well-Point Extraction System**

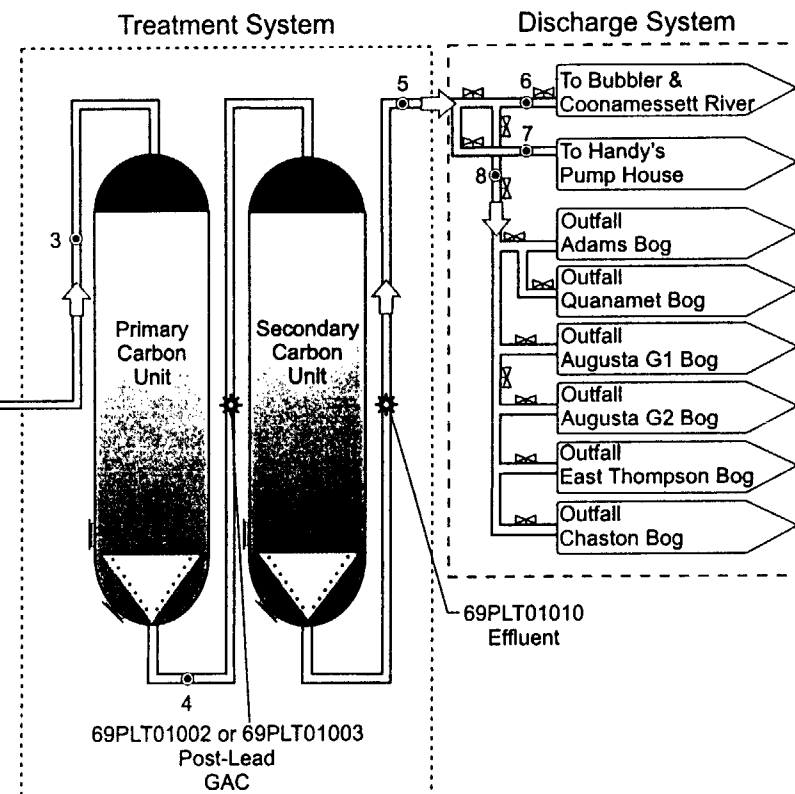
Massachusetts Military Reservation  
Cape Cod, Massachusetts

09/11/00 SC FS28apshallow.dwg **Figure 2-4**



Node Point Information

Point	Typical Flow	EDB Present (Yes/No)
1	400	YES
2	350	YES
3	750	YES
4	750	NO
5	750	NO
6	750	NO
7	0	NO
8	0	NO



Note: If EDB is detected after the primary granular activated carbon unit, then AFCEE will change out the carbon.

☼ Sample Port

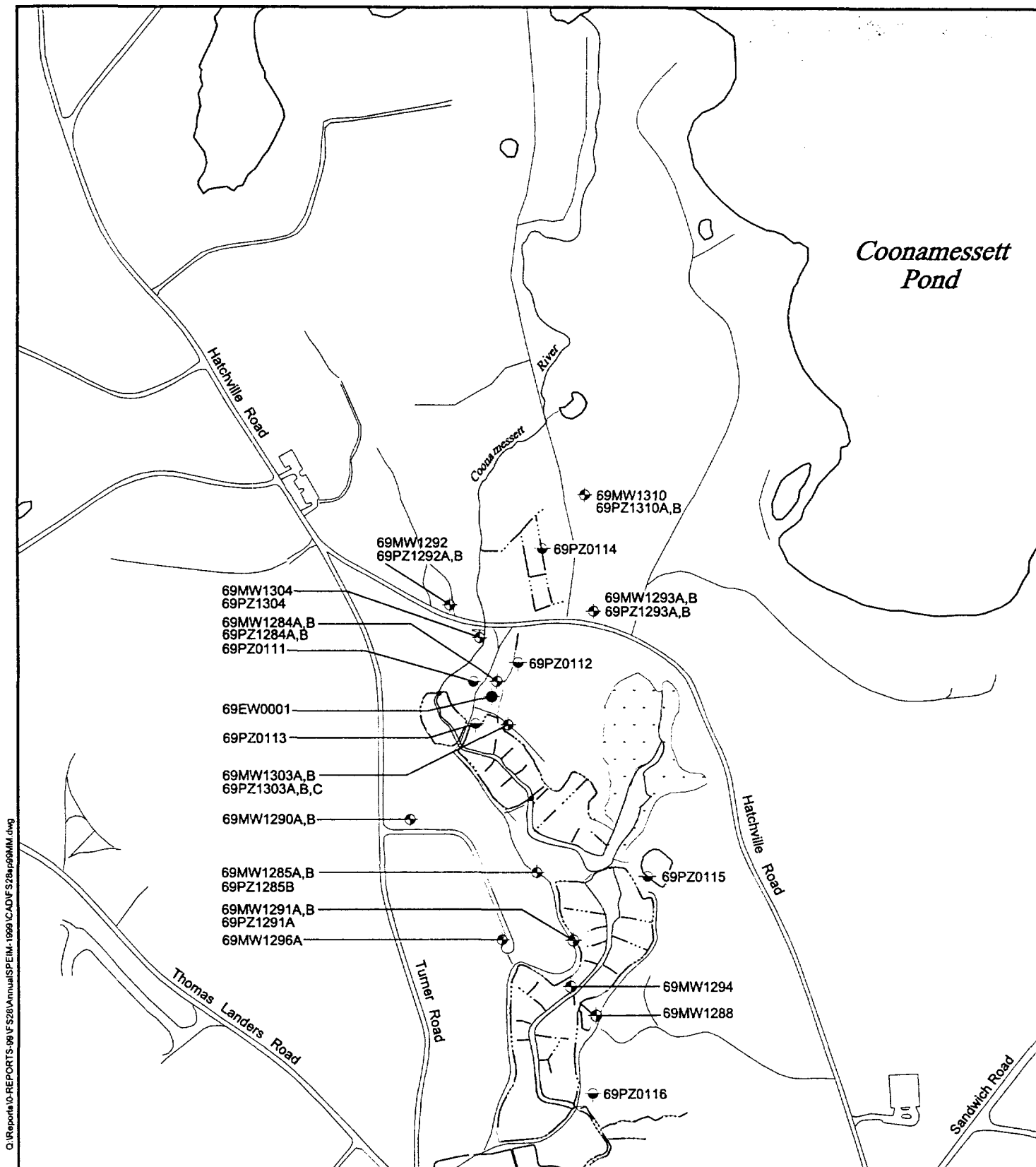
GPM = gallons per minute  
EWP = extraction well pump

**JE** JACOBS ENGINEERING

**FS-28 Treatment System  
Groundwater Flow Diagram**  
Massachusetts Military Reservation  
Cape Cod, Massachusetts




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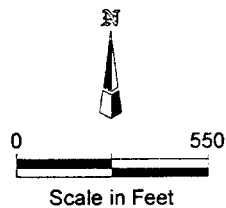
**Figure 2-5**



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### Legend

-  Monitoring Well
-  Extraction Well (Not Monitored)
-  Piezometer



**JE** JACOBS ENGINEERING

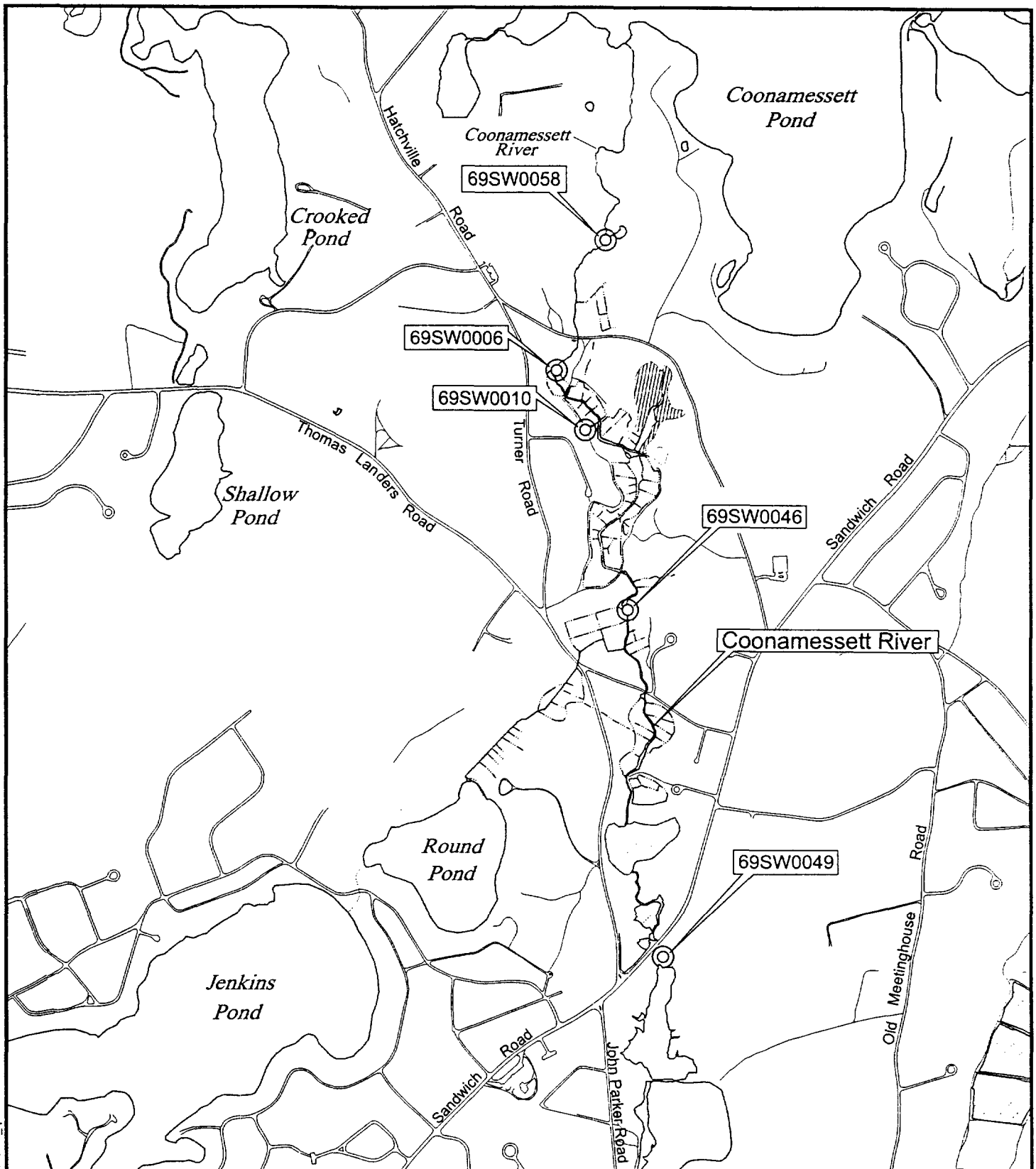
### FS-28 Plume Monthly Groundwater Water Level Monitoring Locations

Massachusetts Military Reservation  
Cape Cod, Massachusetts




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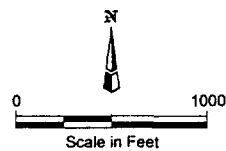
Figure 3-1

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### Legend

-  Discharge Monitoring
-  Bogs
-  Wetland



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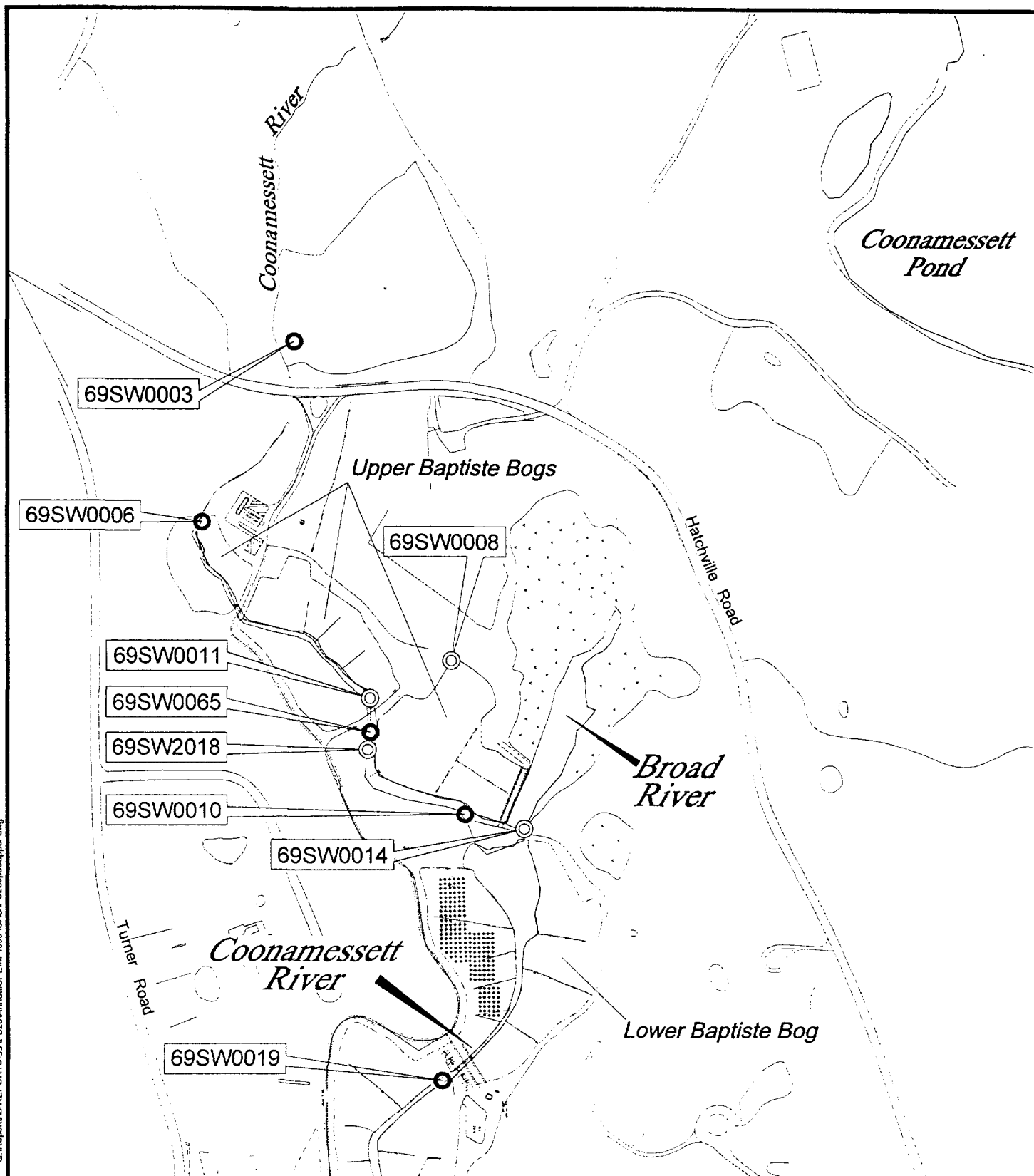
### Coonamessett River Discharge Measurement Locations

Massachusetts Military Reservation  
Cape Cod, Massachusetts

8/23/00 ms File...FS-28sp99-5.cdr

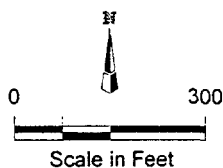
Figure 3-2

last modified: 08/23/00 printed: 08/23/00 by ms Q:\Reports\10-REPORTS-99\FS28\Annual\SPEM-1999\ICAD\FS28sp99upper.dwg



### Legend

- ⊙ Surface Water Sampling Location
- Ecological Sampling Location



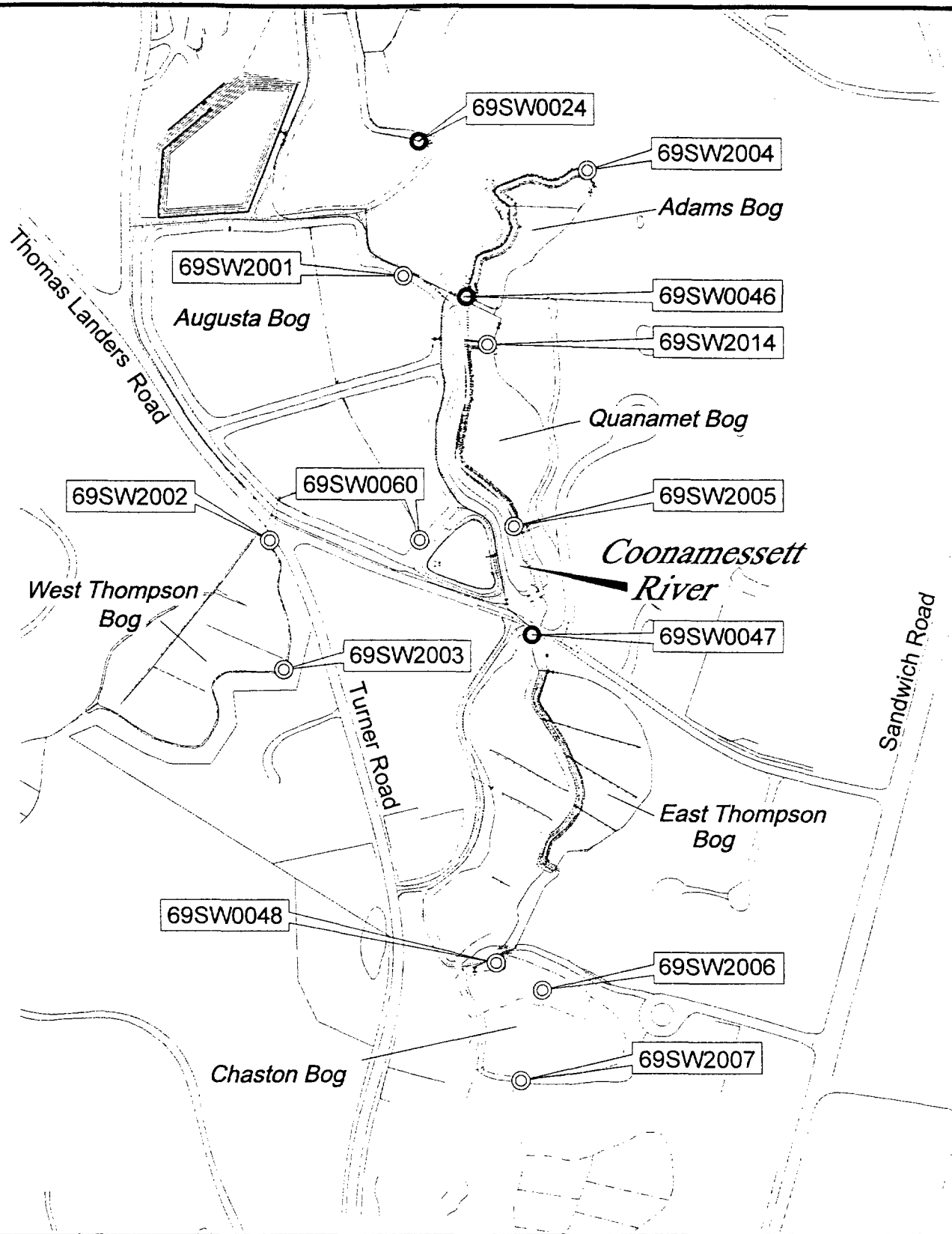
JACOBS ENGINEERING

FS-28 Plume  
Surface Water Sampling  
Locations Upper Reach  
Massachusetts Military Reservation  
Cape Cod, Massachusetts

08/23/00 MS FS28sp99upper.dwg

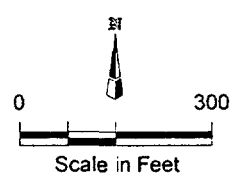
Figure 3-3

last modified: 08/23/00 printed: 08/23/00 by ms Q:\Reports\10-REPORTS-99\FS28\AnnualSPEIM-1999\CAD\Fig28sp99middle.dwg



**Legend**

- ⊙ Surface Water Sampling Location
- Ecological Sampling Location

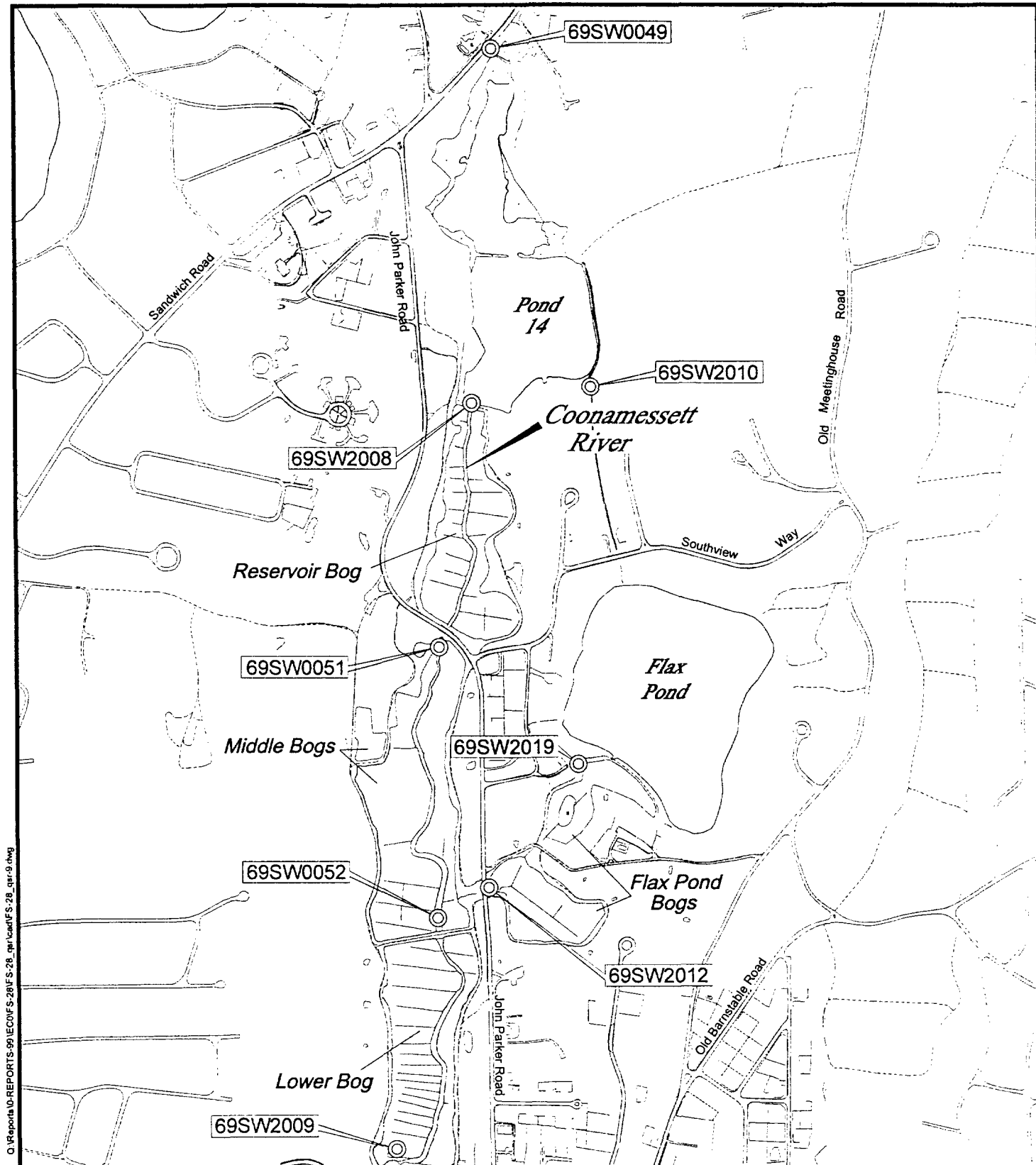


**JE** JACOBS ENGINEERING

**FS-28 Plume  
Surface Water Sampling  
Locations, Middle Reach**  
Massachusetts Military Reservation  
Cape Cod, Massachusetts

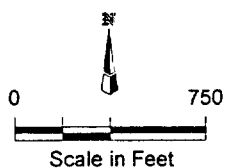
08/23/00 MS FS28sp99middle.dwg

**Figure 3-4**



### Legend

○ Surface Water Sampling Location



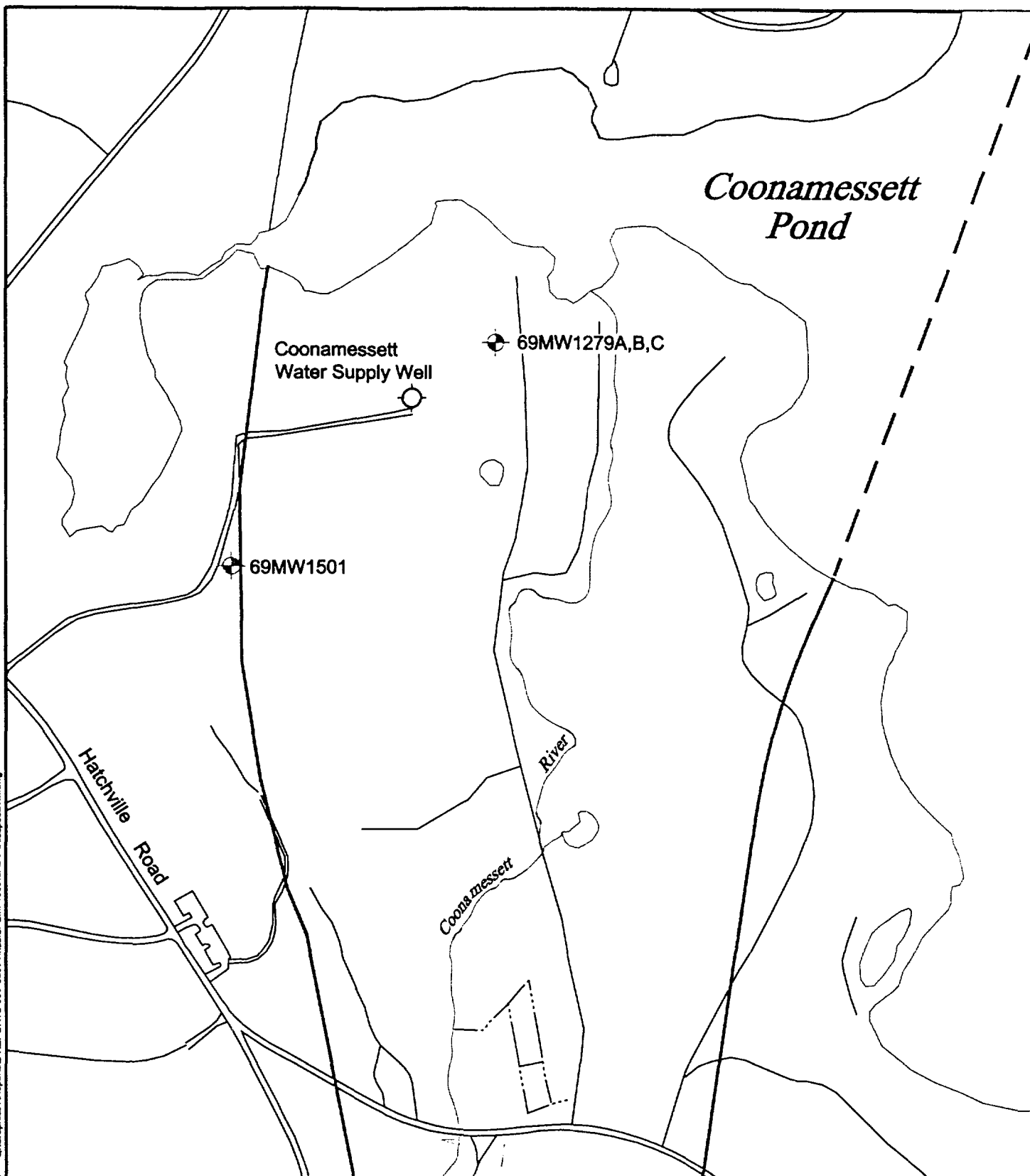
JACOBS ENGINEERING

**FS-28 Plume  
Surface Water Sampling  
Locations, Lower Reach**  
Massachusetts Military Reservation  
Cape Cod, Massachusetts




08/23/00 MS FS-28\_qsr-9.dwg

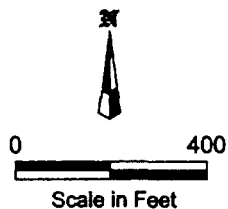
Figure 3-5

last modified: 06/11/00 printed: 09/11/00 by ec Q:\Graphics\1\Reports\0-REPORTS-99\FS28AnnualSPEIM-1999\CAD\F528ap08L.TM.dwg



#### Legend

-  Water Supply Well
-  Monitoring Well
-  Plume Contour  
(EDB MCL = 0.02µg/L)  
(1998 Data)



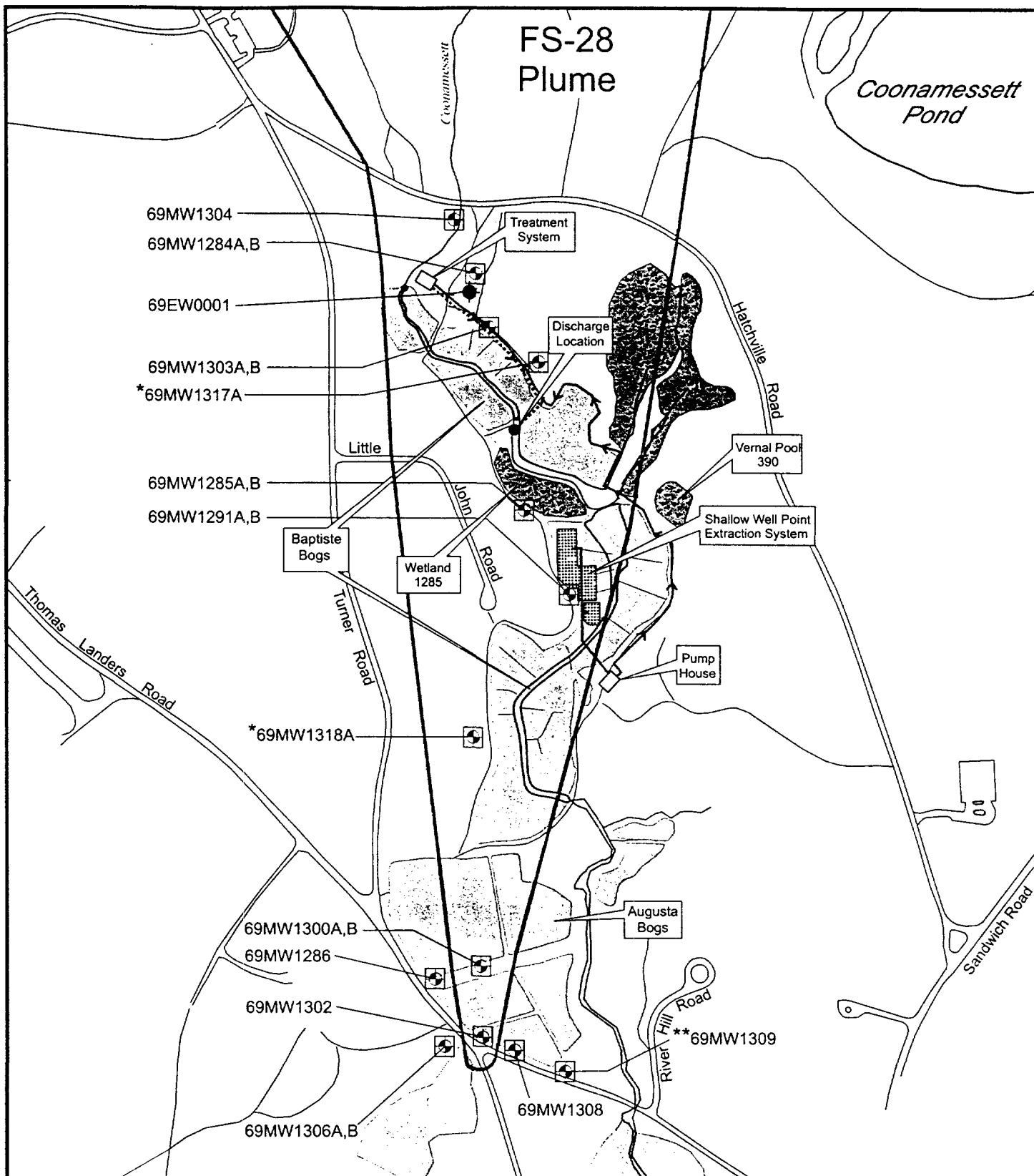
**JE** JACOBS ENGINEERING

### Upper FS-28 Plume Groundwater Monitoring Location

Massachusetts Military Reservation  
Cape Cod, Massachusetts

09/11/00 SC FS28ep99LTM.dwg

Figure 3-6



### Legend



Monitoring Well Sampled  
Quarterly For EDB



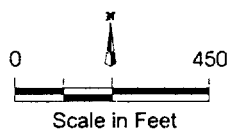
Extraction Well



Effluent Discharge Location

\* Added to quarterly monitoring starting in  
January 2000.

\*\* Dropped from quarterly monitoring starting in  
January 2000.



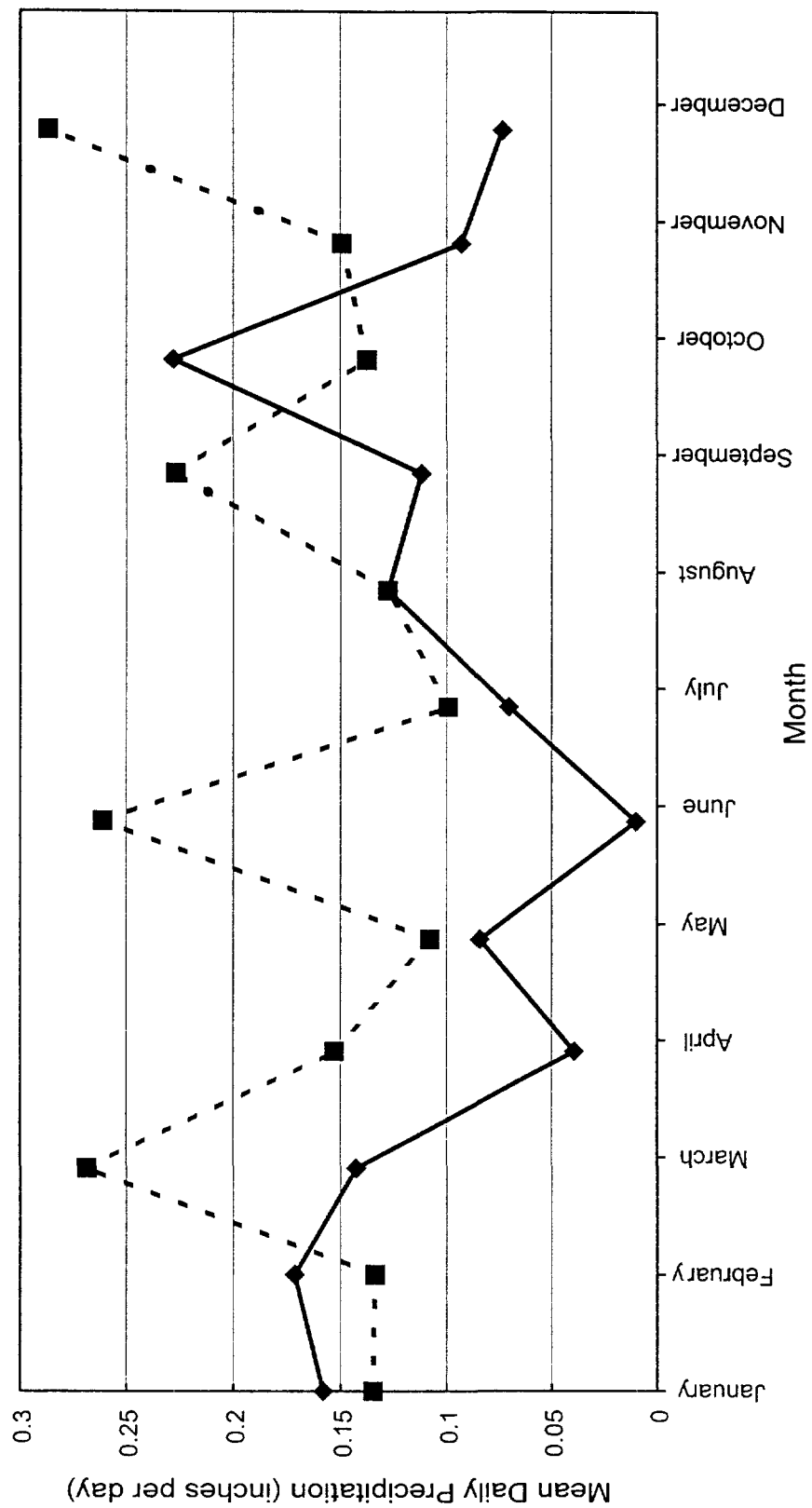
JACOBS ENGINEERING

### Lower FS-28 Plume Groundwater Monitoring

Massachusetts Military Reservation  
Cape Cod, Massachusetts

8/24/00 ms File...FS28sp99-6.cdr

Figure 3-7



Legend

—◆— 1999 Mean Daily Precipitation per Month

- - ■ - - Twenty-Year Average Precipitation



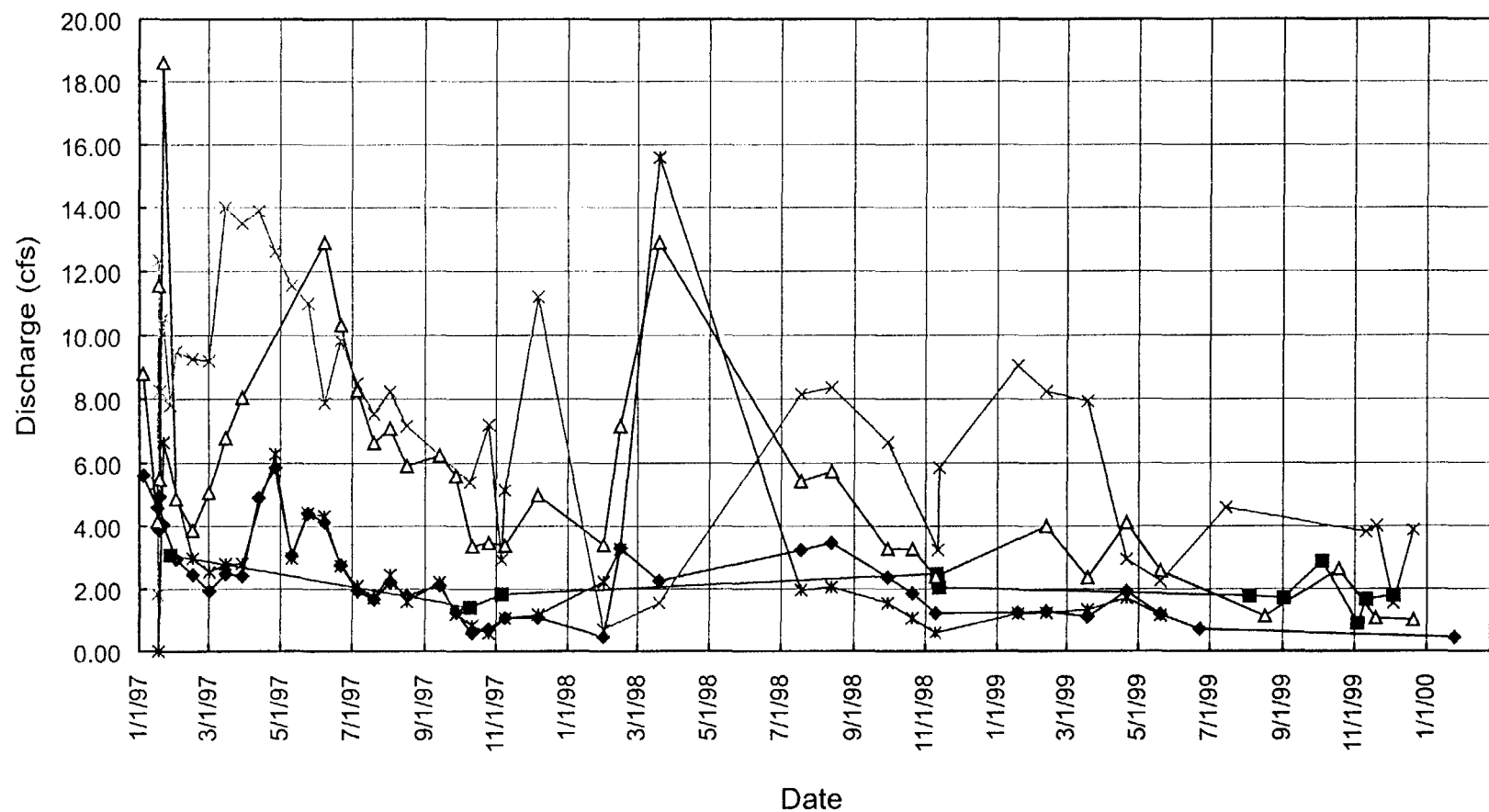
JACOBS ENGINEERING

1999 Precipitation  
Measurements

Massachusetts Military Reservation  
Cape Cod, Massachusetts

8/24/00 mm File...FS28sp99-9.cdr

Figure 4-1



### Legend

\* = prior to 8/3/99 69SW0010 was referenced to 69SW0009, the nearest upstream location.

- ◆ 69SW0058
- ✱ 69SW0006
- 69SW0010\*
- ▲ 69SW0046
- ✕ 69SW0049
- cfs = cubic feet per second

**JE** JACOBS ENGINEERING

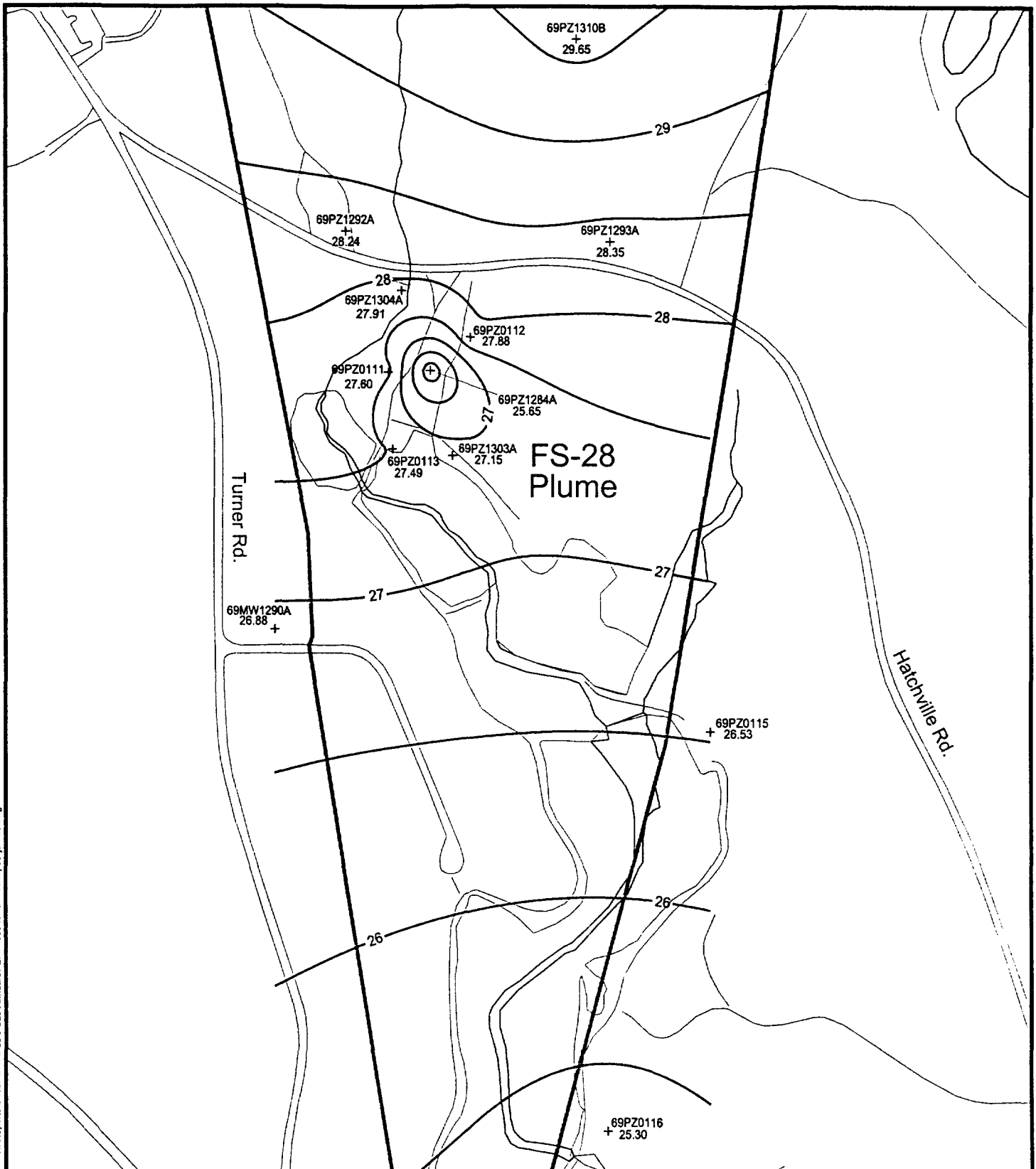
### Coonamesett River Discharge

Massachusetts Military Reservation  
Cape Cod, Massachusetts

8/24/00 ms File...FS28ap99-8.cdr

Figure 4-2

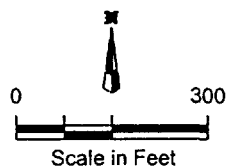
last modified: 08/24/00 printed: 08/29/00 by sc X:\Reports\10-REPORTS\99\FS28\AnnualSPEM-1999\CAD\F528sp99-jan-99.dwg



### Legend

— 26 —

Water Table Elevation Contour (ft msl )

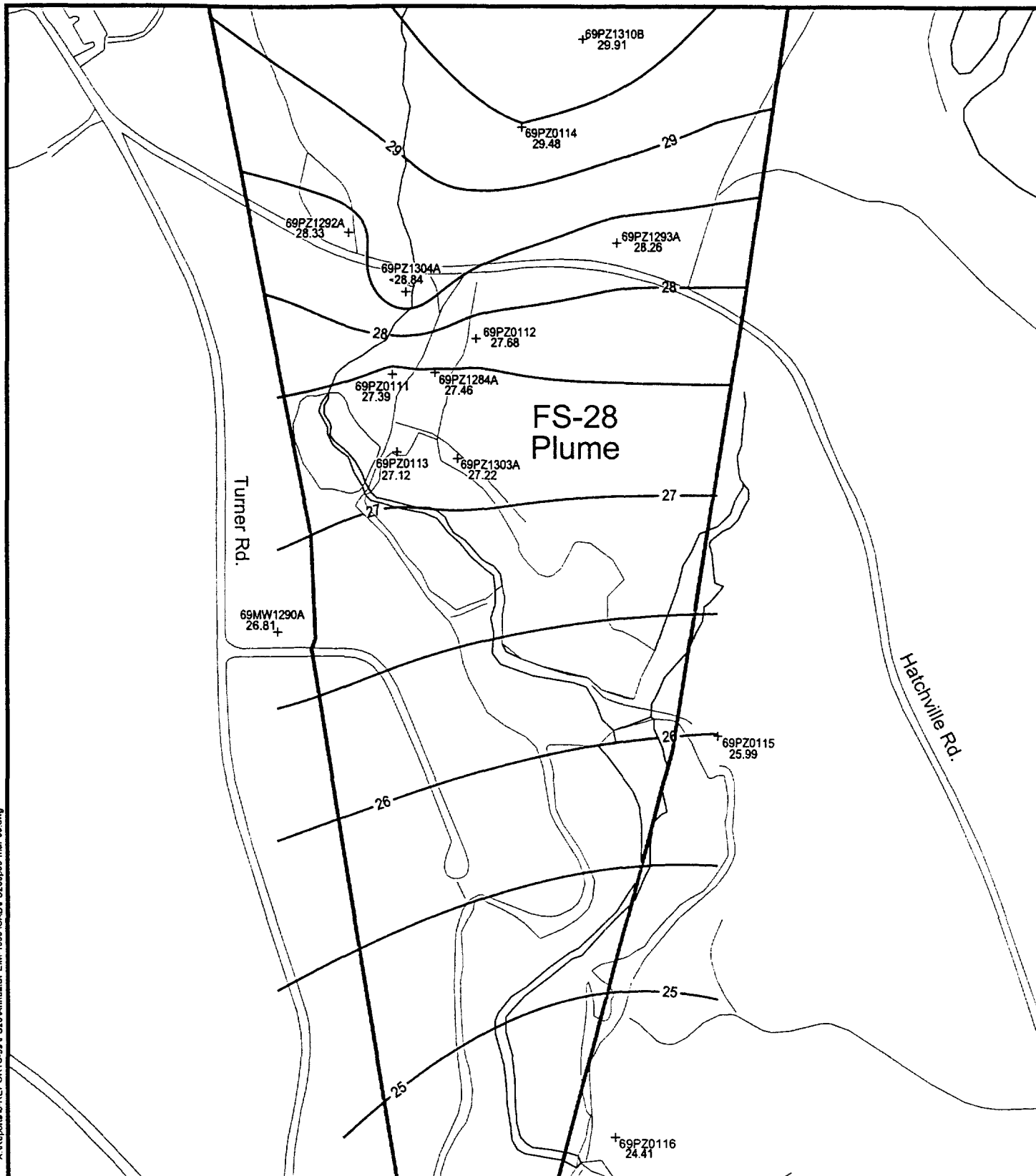


JACOBS ENGINEERING

**FS-28 Plume**  
**January 1999**  
**Water Table Elevations**  
Massachusetts Military Reservation  
Cape Cod, Massachusetts

08/24/00 SC FS28sp99-jan-99.dwg

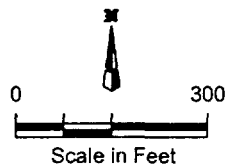
Figure 4-3



### Legend



Water Table Elevation Contour (ft msl)



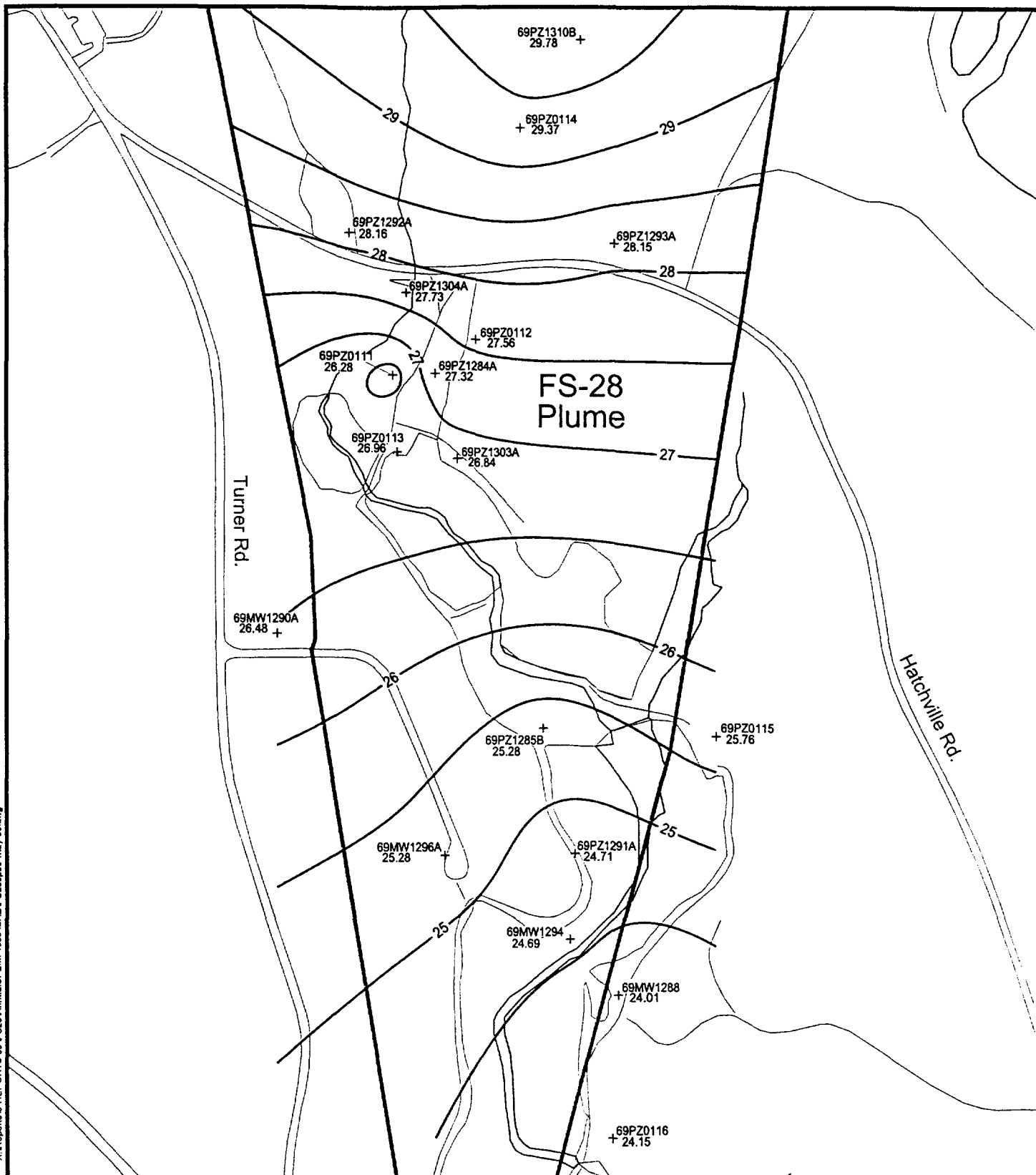
JACOBS ENGINEERING

**FS-28 Plume**  
**March 1999**  
**Water Table Elevations**  
 Massachusetts Military Reservation  
 Cape Cod, Massachusetts

08/29/00 SC FS28sp99-mar-99.dwg

Figure 4-4

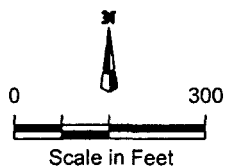
X:\Reports\0-REPORTS-99\FS28\Annual\SP-1999\CAD\FS28sp99-may-99.dwg  
last modified: 08/29/00 printed: 08/29/00 by sc



### Legend



Water Table Elevation Contour (ft msl)



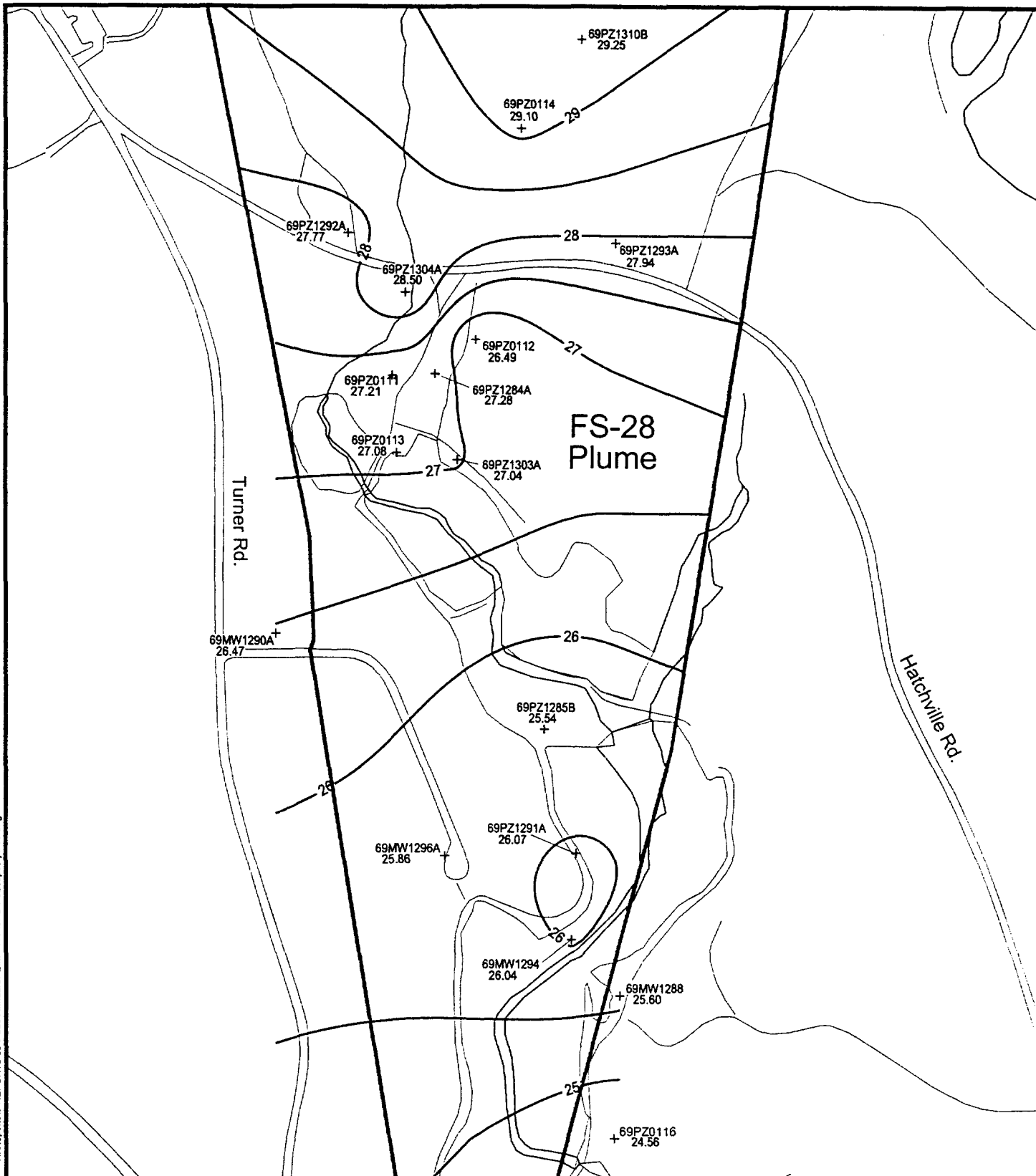
JACOBS ENGINEERING

**FS-28 Plume**  
**May 1999**  
**Water Table Elevations**  
Massachusetts Military Reservation  
Cape Cod, Massachusetts

08/29/00 SC FS28sp99-may-99.dwg

Figure 4-5

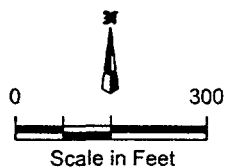
test modified: 08/24/00 printed: 08/24/00 by sc X:\Reports\0-REPORTS\99\F528\Annual\SPEIM-1999\CAD\F528sp99-jul-99.dwg



### Legend

—26—

Water Table Elevation Contour (ft msl)



JACOBS ENGINEERING

FS-28 Plume

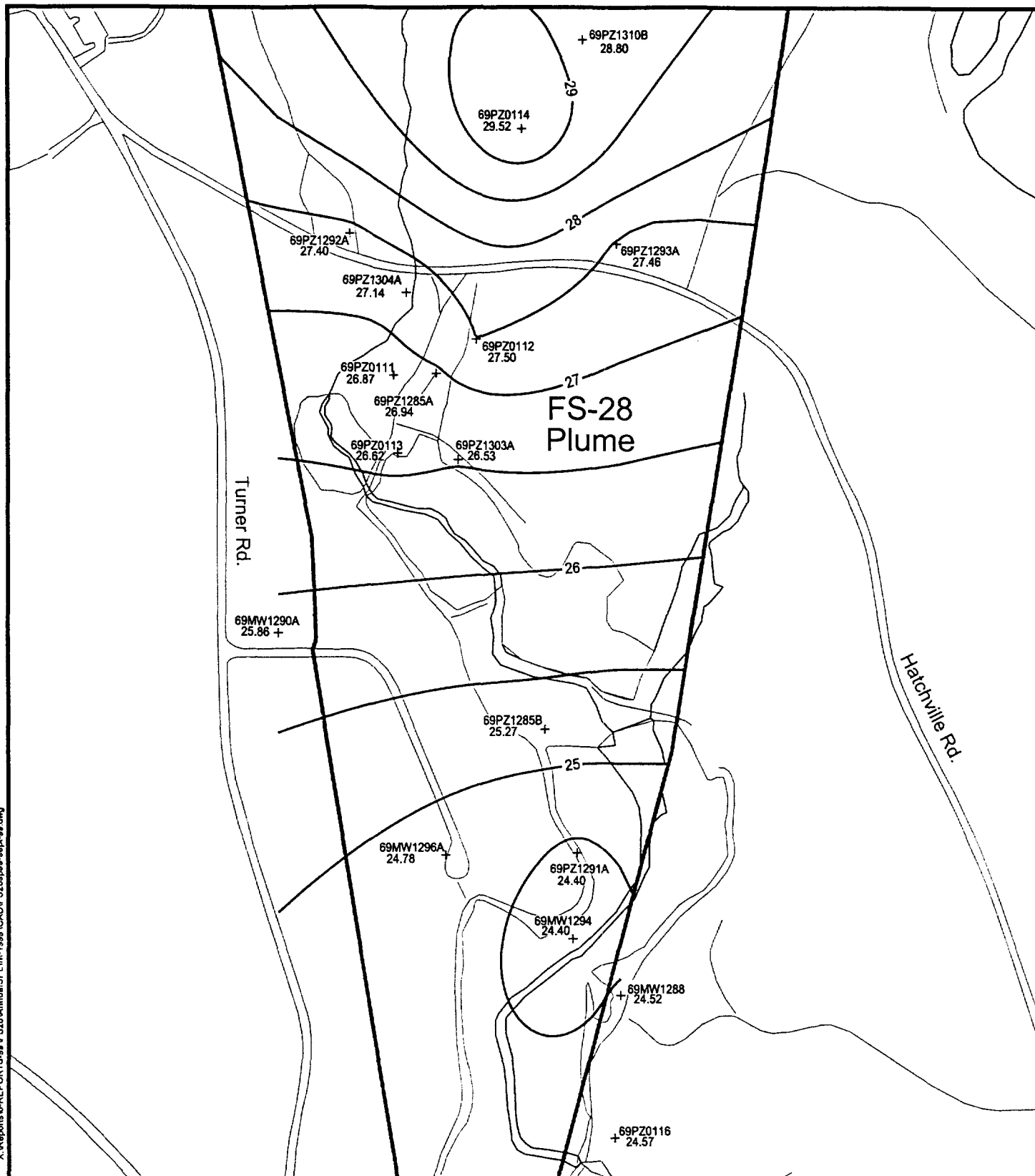
July 1999

Water Table Elevations

Massachusetts Military Reservation  
Cape Cod, Massachusetts

08/24/00 SC FS28sp99-jul-99.dwg

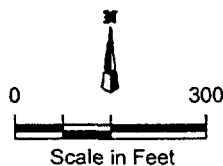
Figure 4-6



## Legend

25

Water Table Elevation Contour (ft msl)

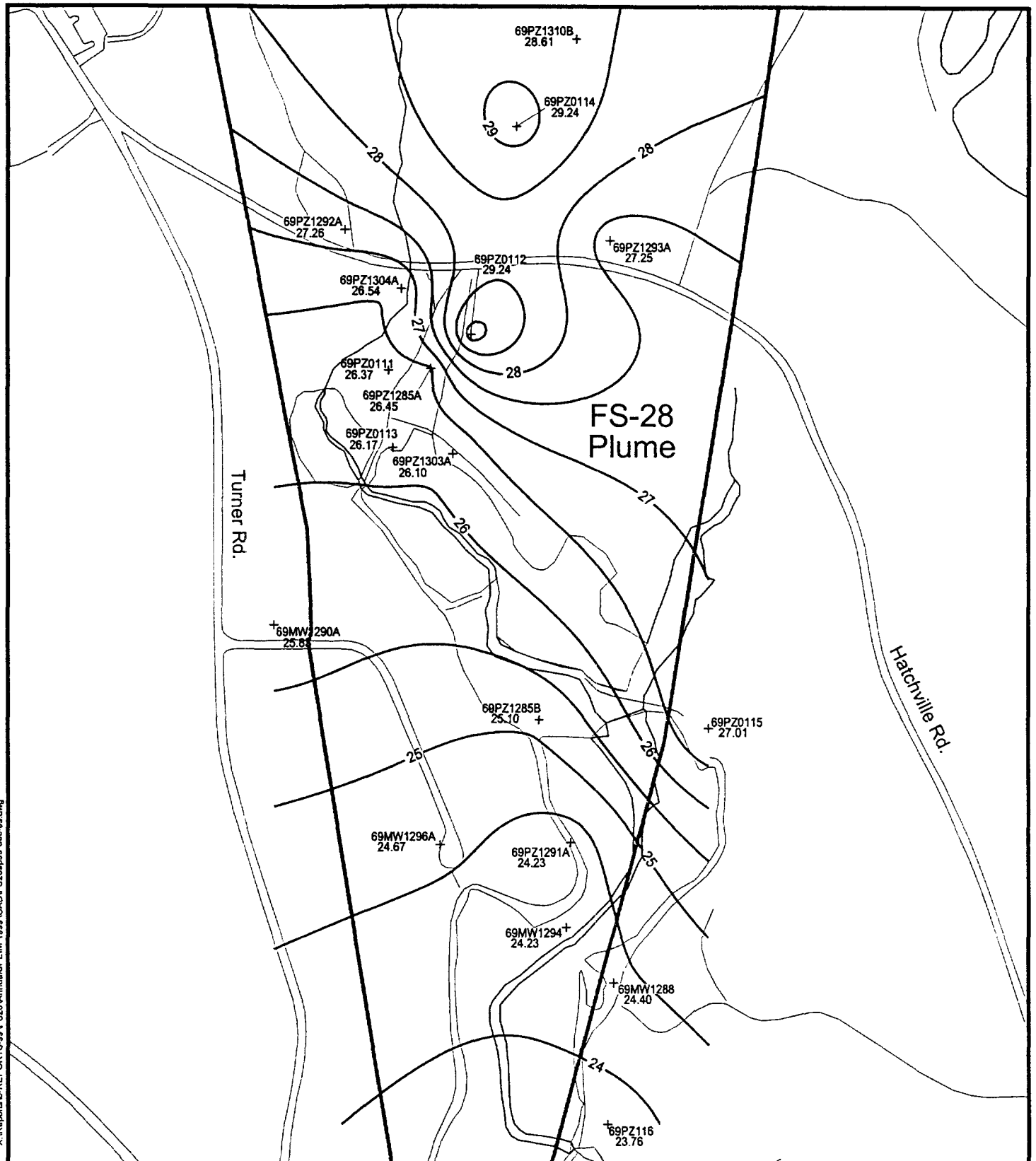


JACOBS ENGINEERING

**FS-28 Plume**  
**September 1999**  
**Water Table Elevations**  
 Massachusetts Military Reservation  
 Cape Cod, Massachusetts

08/29/00 SC FS28sp99-sept-99.dwg

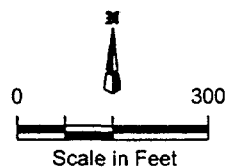
Figure 4-7



## Legend

— 26 —

Water Table Elevation Contour (ft msl)



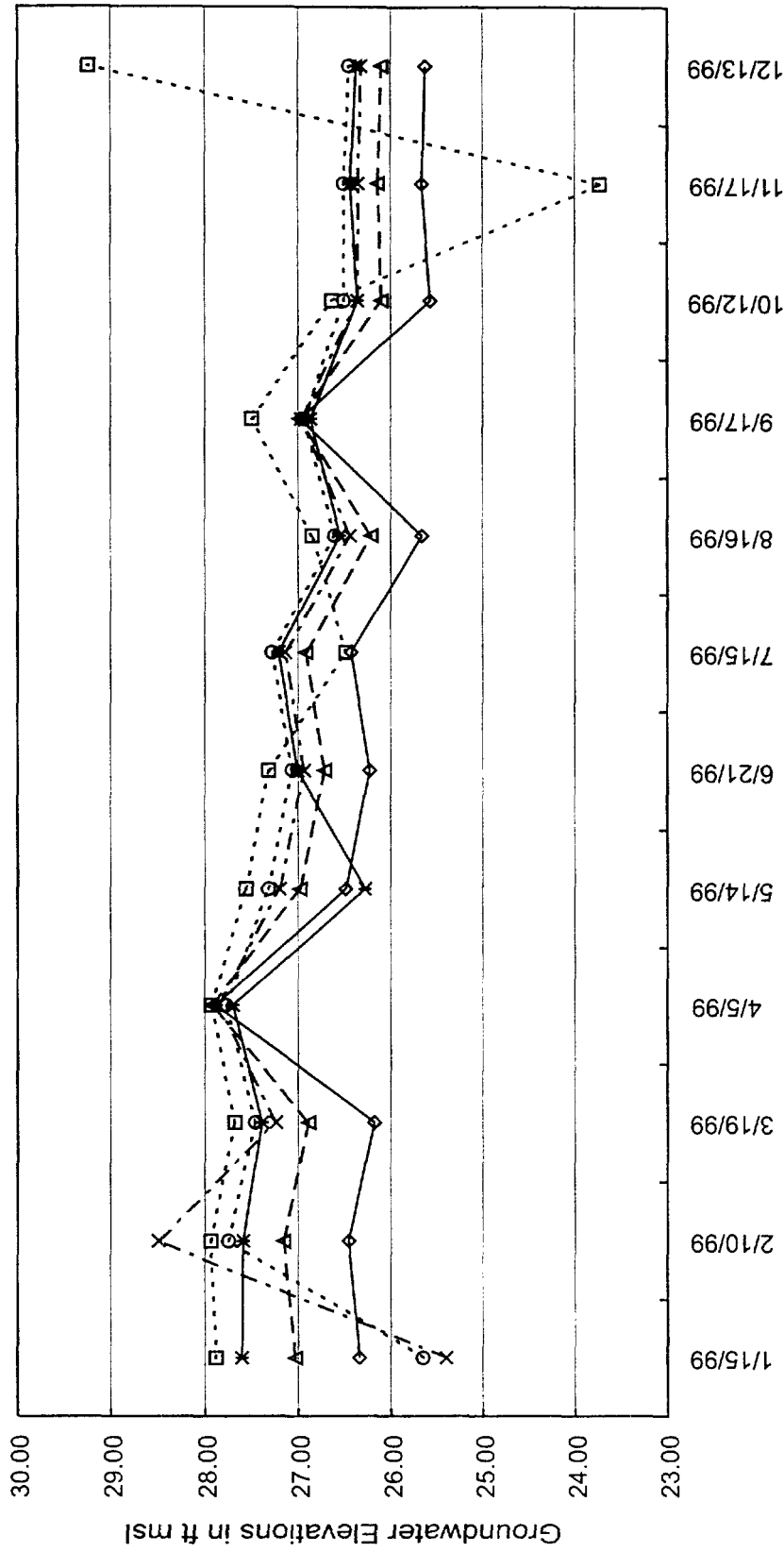
JACOBS ENGINEERING

## FS-28 Plume December 1999 Water Table Elevations

Massachusetts Military Reservation  
Cape Cod, Massachusetts

08/29/00 SC FS28sp99-dec-99.dwg

Figure 4-8



# Legend

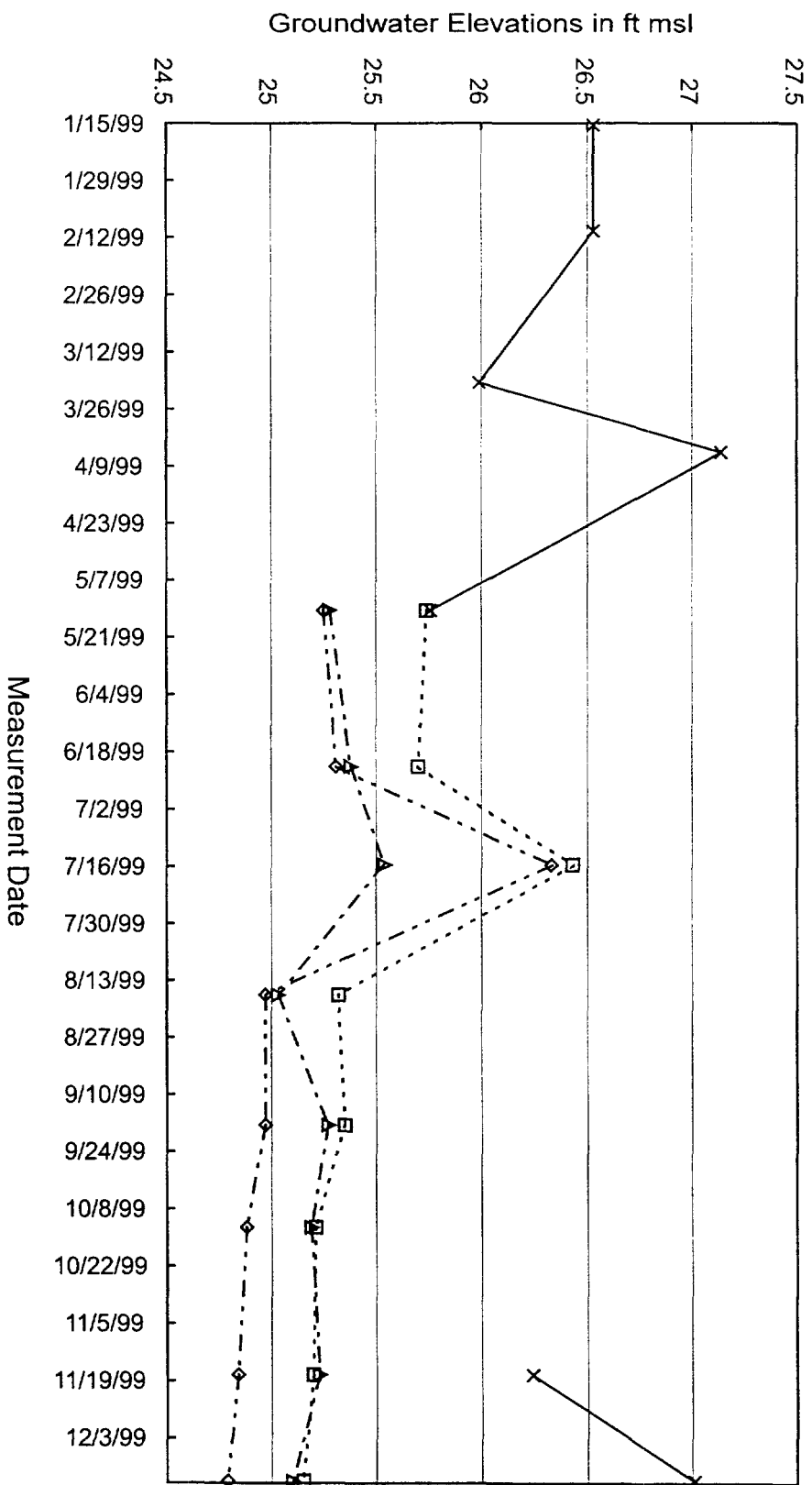
- ◇— 69MW1284A    - - ○ - - 69PZ1284A    - - □ - - 69PZ0112
- - △ - 69MW1284B    - - × - - 69PZ1284B    —\*— 69PZ0111

**JE** JACOBS ENGINEERING

FS-28 Plume  
Well Cluster 69MW1284 and  
Piezometers 69PZ0111, 69PZ0112  
Groundwater Elevations  
Massachusetts Military Reservation  
Cape Cod, Massachusetts

8/24/00 ms File...FS28sp99-21.cdr

Figure 4-9



# Legend

- ◇— 69MW1285A
- 69MW1285B
- △--- 69PZ1285B
- X— 69PZ0115

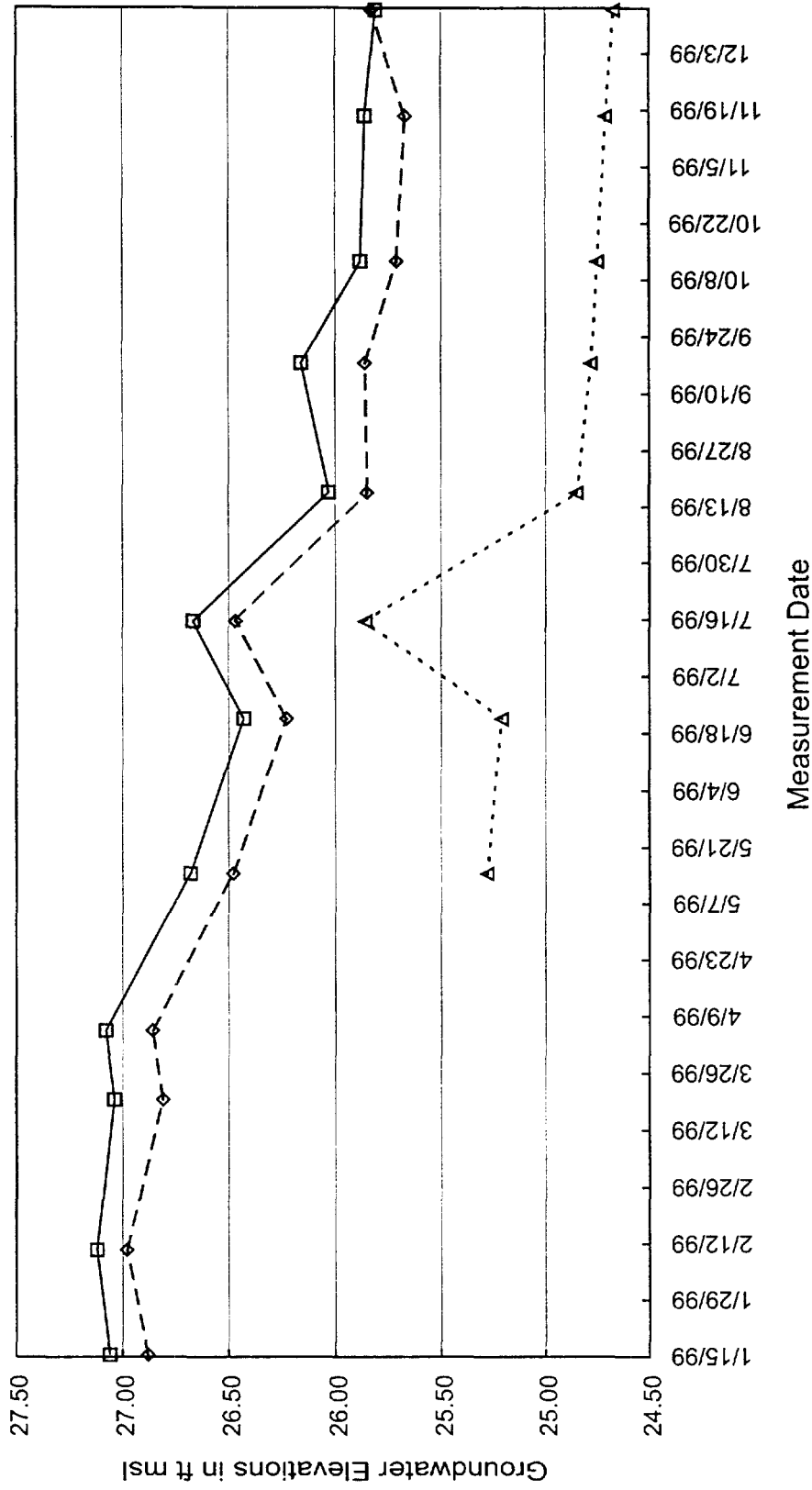


JACOBS ENGINEERING

FS-28 Plume  
Well Cluster 69MW1285 and  
Piezometer 69PZ0115  
Groundwater Elevations  
Massachusetts Military Reservation  
Cape Cod, Massachusetts

8/24/00 msl File...FS28sp99-22.cdr

Figure 4-10



# Legend

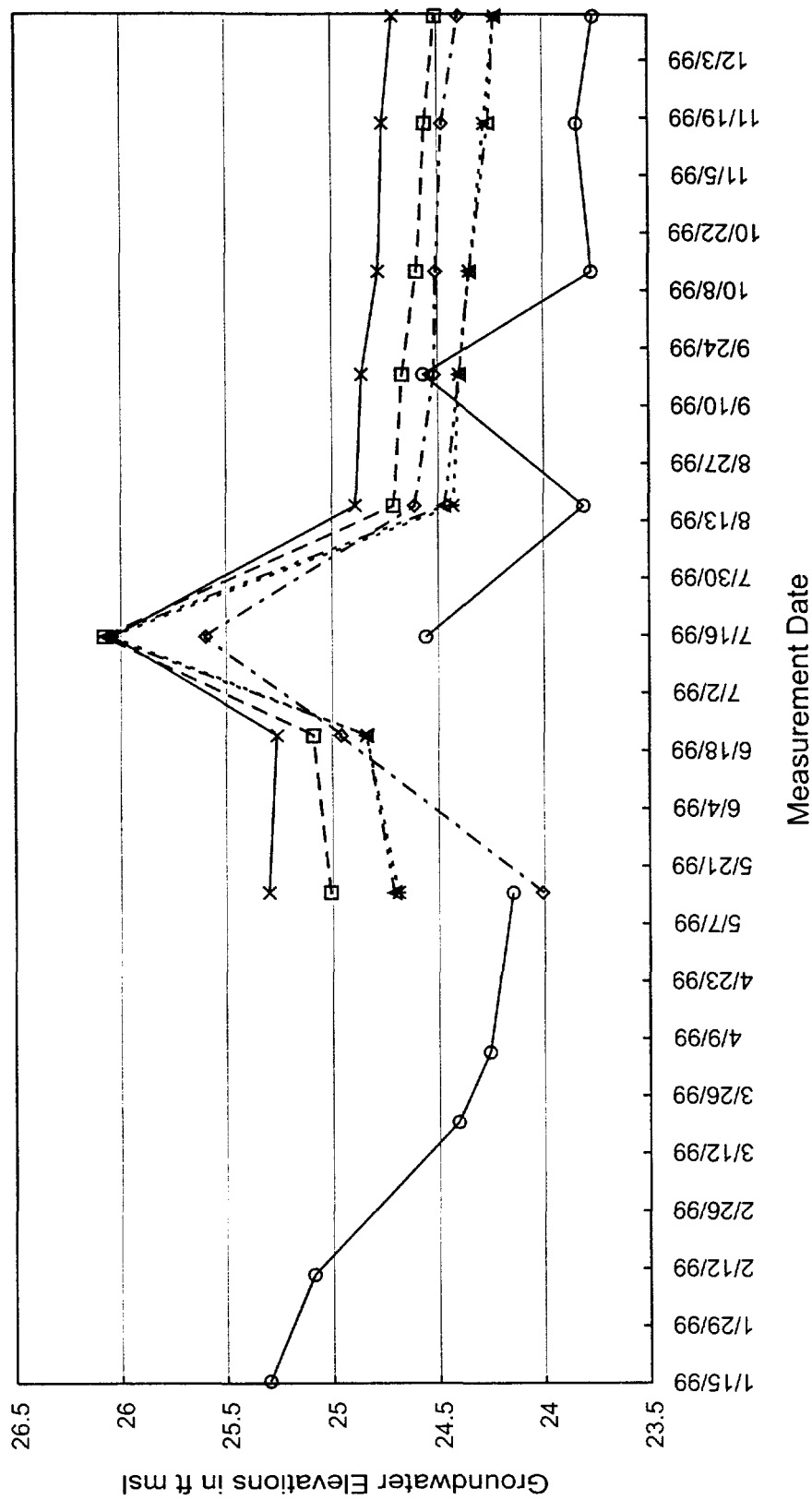
- ◆ — 69MW1290A
- □ — 69MW1290B
- △ — 69MW1296A

**JE** JACOBS ENGINEERING

FS-28 Plume  
Well Cluster 69MW1290 and  
Well 69MW1296  
Groundwater Elevations  
Massachusetts Military Reservation  
Cape Cod, Massachusetts

8/24/00 ms File...FS28sp99-23.cdr

Figure 4-11



# **Legend**

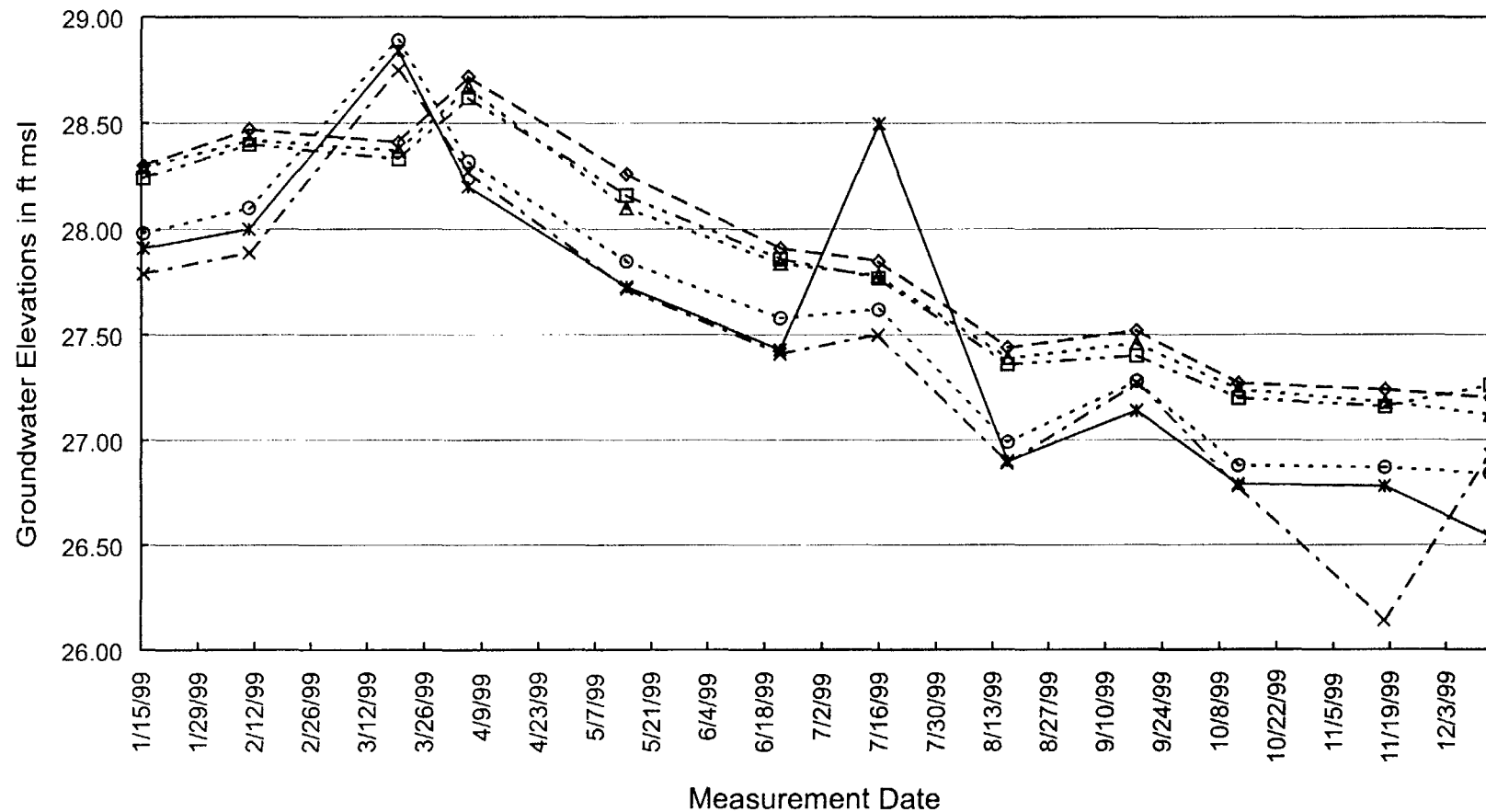
- ◇— 69MW1288
- △— 69MW1291A
- \*— 69MW1291B
- 69PZ0116
- ◇— 69PZ1291A
- \*— 69MW1294

**JF** JACOBS ENGINEERING

FS-28 Plume  
Well Cluster 69MW1291, Wells 69MW1288  
and 69MW1294, Piezometer  
69PZ0116 Groundwater Elevations  
Massachusetts Military Reservation  
Cape Cod, Massachusetts

8/24/00 ms File...FS28ap99-24.cdr

Figure 4-12



### Legend

—◆— 69MW1292	—□— 69PZ1292A
—×— 69MW1304	—△— 69PZ1292B
—○— 69PZ1304B	—*— 69PZ1304A



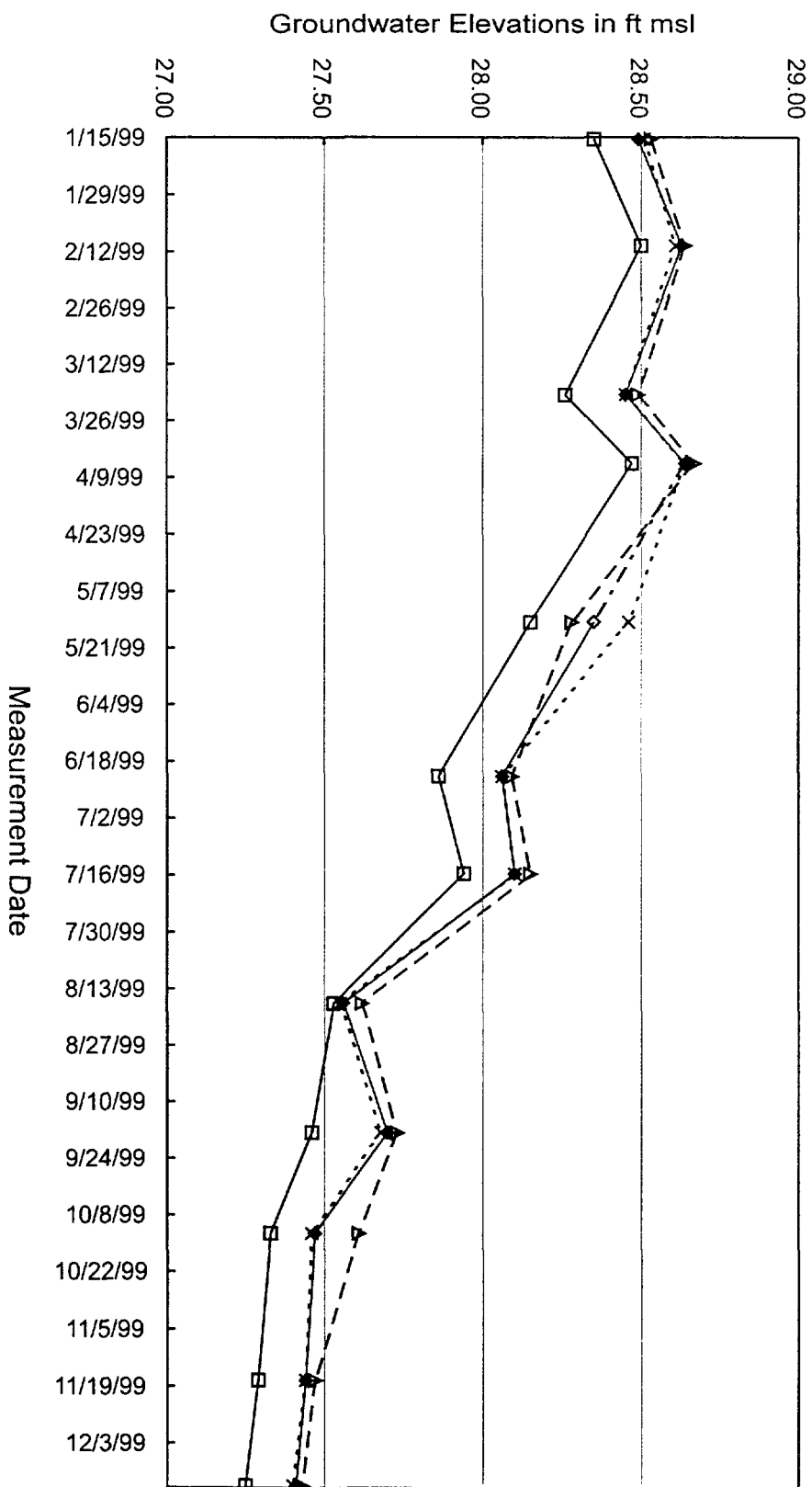
JACOBS ENGINEERING

FS-28 Plume  
Well Clusters 69MW1292 and  
69MW1304 Groundwater Elevations

Massachusetts Military Reservation  
Cape Cod, Massachusetts

8/24/00 ms File...FS28sp99-25.cdr

Figure 4-13



# Legend

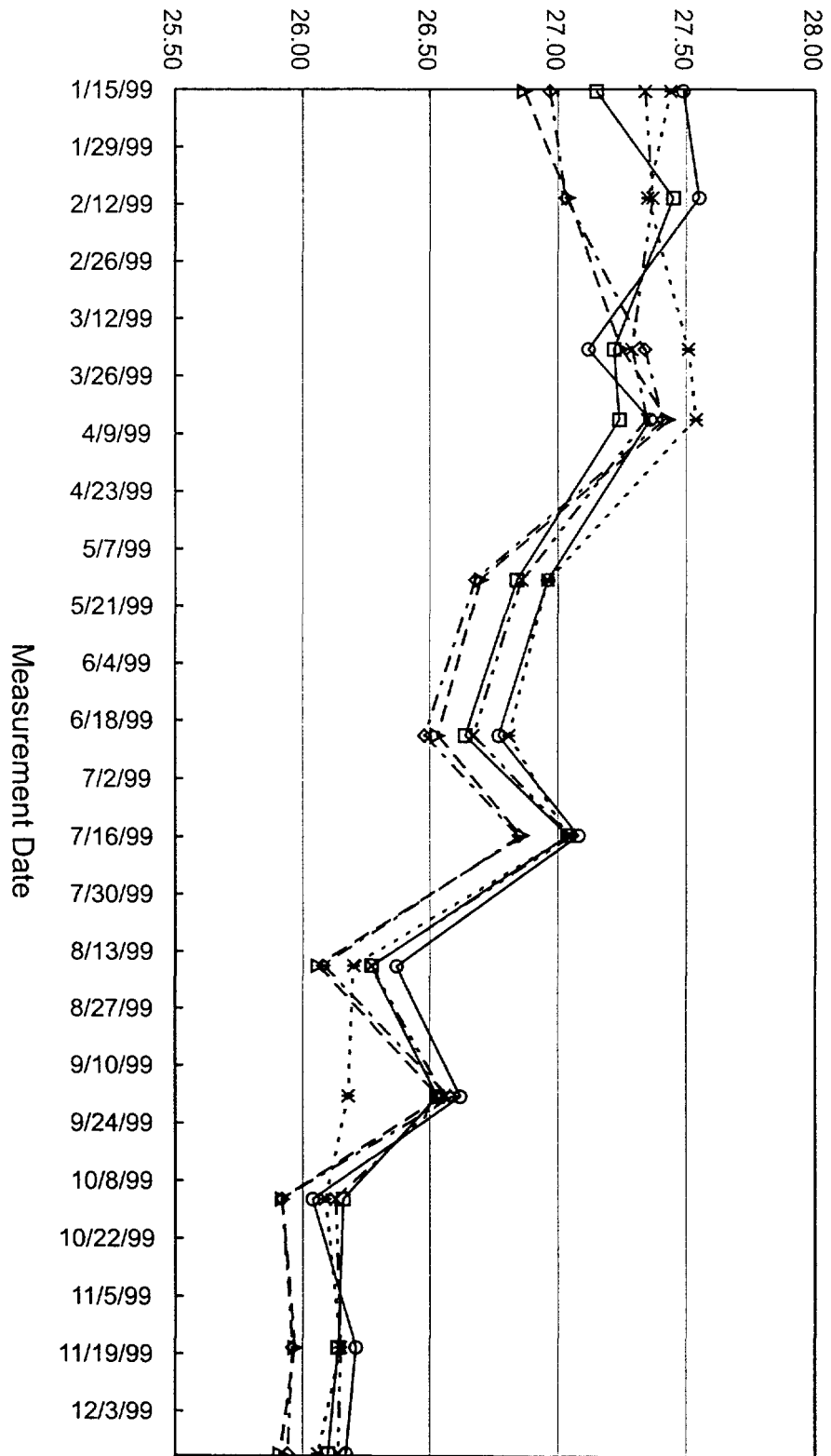
- ◆— 69MW1293A
- 69PZ1293A
- △— 69MW1293B
- ×— 69PZ1293B



JACOBS ENGINEERING

FS-28 Plume  
Well Clusters 69MW1293  
Groundwater Elevations  
Massachusetts Military Reservation  
Cape Cod, Massachusetts

# Groundwater Elevations in ft msl



## Legend

- ◆— 69MW1303A
- 69PZ1303A
- ▲— 69MW1303B
- ×— 69PZ1303B
- \*— 69PZ1303C
- 69PZ0113



JACOBS ENGINEERING

FS-28 Plume

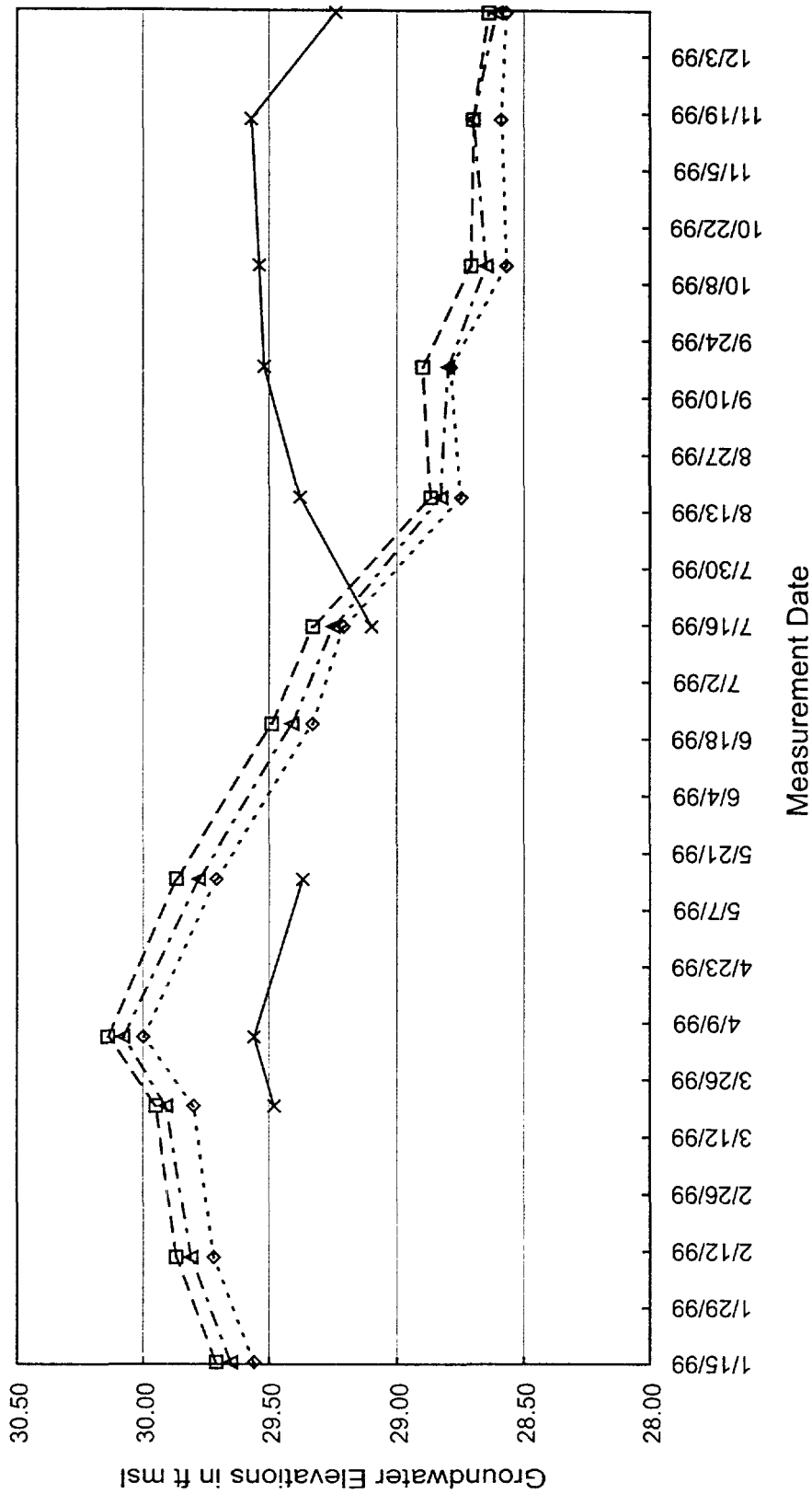
Well Cluster 69MW1303 and

Piezometer 69PZ0113

Groundwater Elevations

Massachusetts Military Reservation

Cape Cod, Massachusetts



# Legend

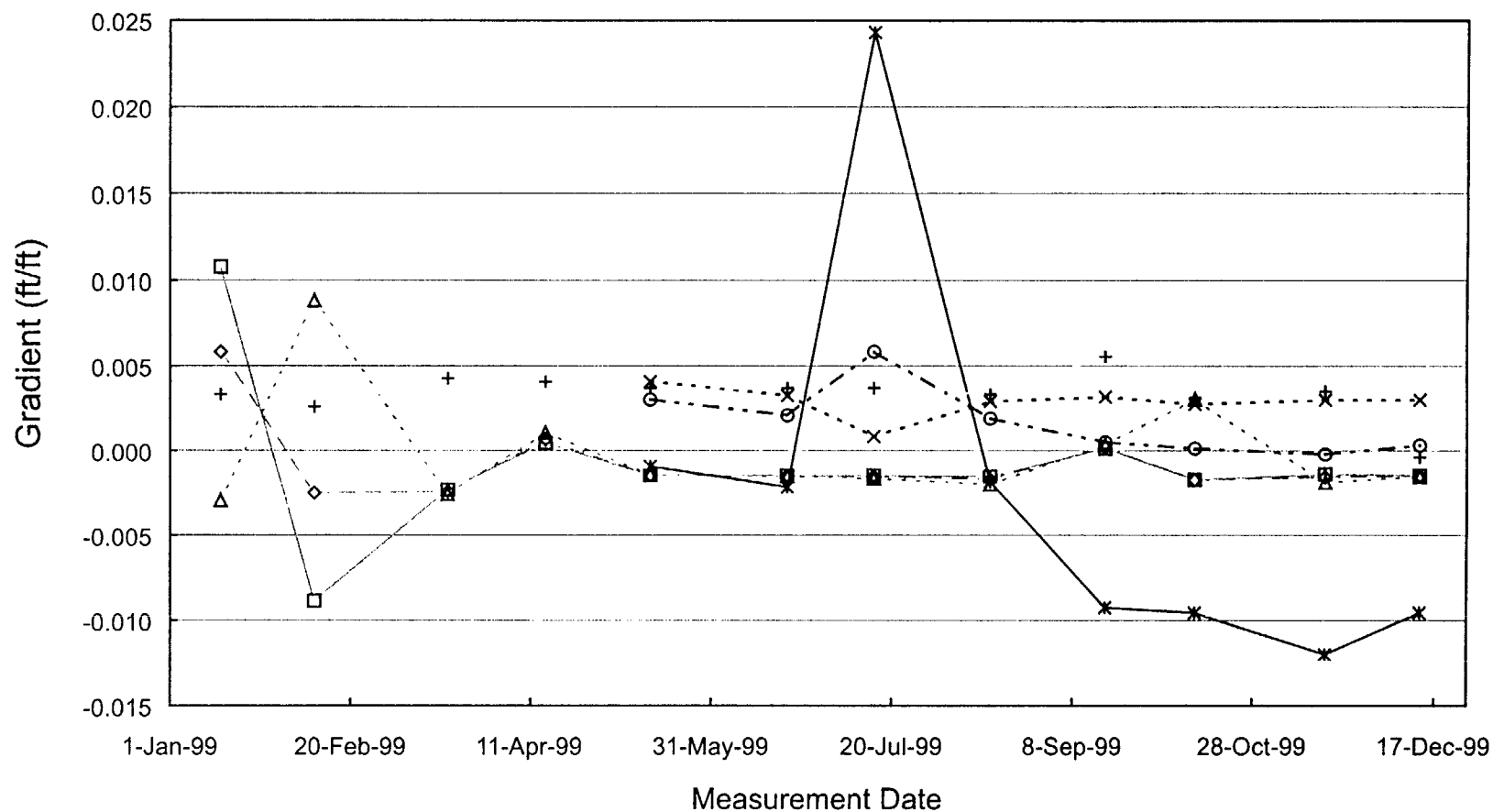
- ◇--- 69MW1310
- - - □ - - 69PZ1310A
- - - △ - - 69PZ1310B
- ×--- 69PZ0114

**JE** JACOBS ENGINEERING

FS-28 Plume  
Well Cluster 69MW1310 and  
Piezometer 69PZ0114  
Groundwater Elevations  
Massachusetts Military Reservation  
Cape Cod, Massachusetts

8/24/00 ms File...FS28sp99-28.cdr

Figure 4-16



### Legend

---◇---	1284T,B	---×---	1285M,B
---□---	1284M,B	---*---	1285T,M
---△---	1284T,M	---○---	1285T,B
		+	1290T,B

Negative gradient denotes downward flow  
 T = top screen  
 M = middle screen  
 B = bottom screen  
 ft/ft = feet per foot

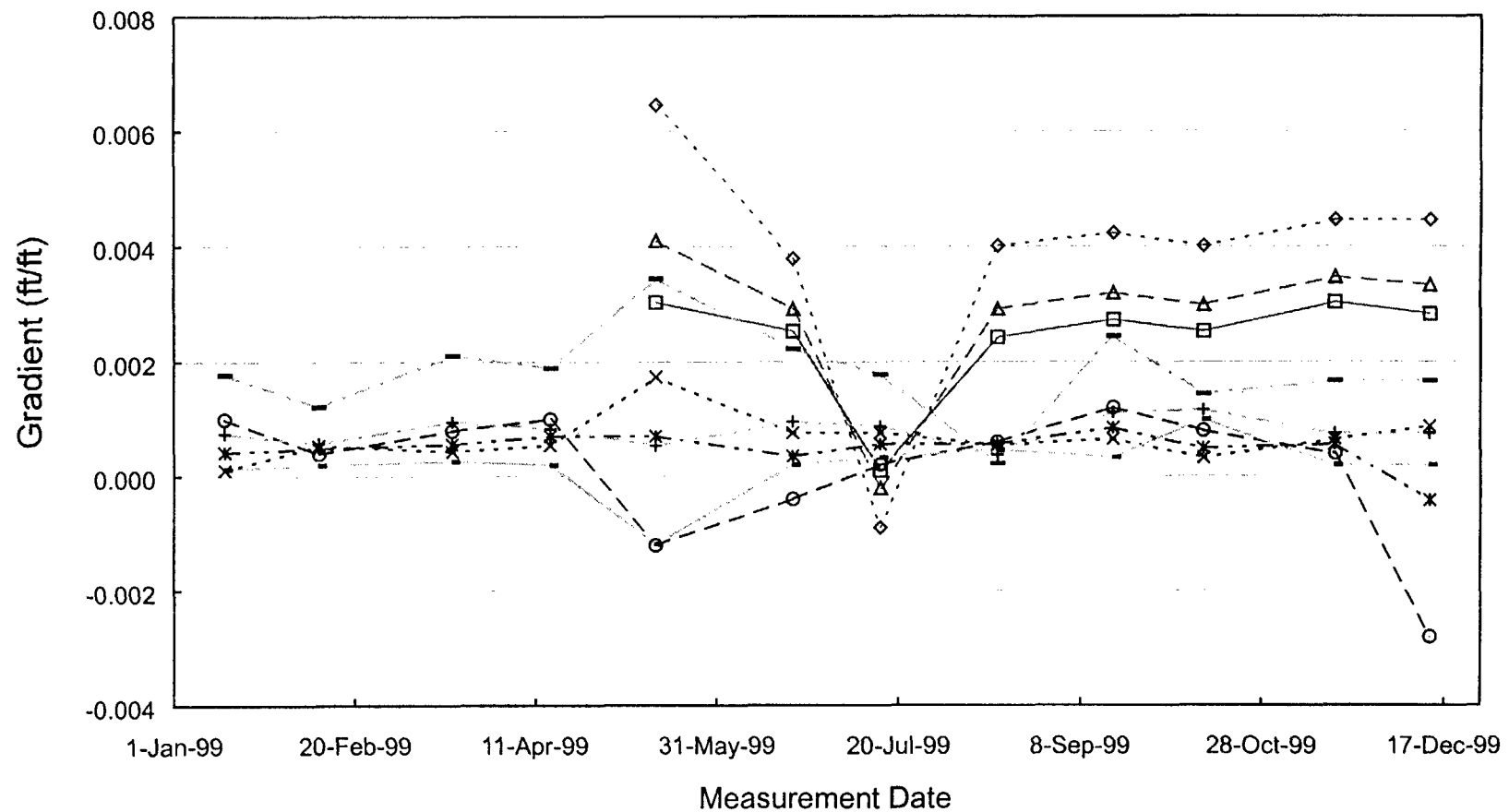


JACOBS ENGINEERING

FS-28 Plume  
 Well Clusters 69MW1284,  
 69MW1285, and 69MW1290  
 Vertical Gradients  
 Massachusetts Military Reservation  
 Cape Cod, Massachusetts

8/24/00 ms File...FS28sp99-12.cdr

Figure 4-17



### Legend

--◇-- 1291M,B	--×-- 1292M,B	+ -- 1293T,B
—■— 1291T,M	--*-- 1292T,B	---■--- 1293M,B
--△-- 1291T,B	--○-- 1292T,M	---+--- 1293T,M

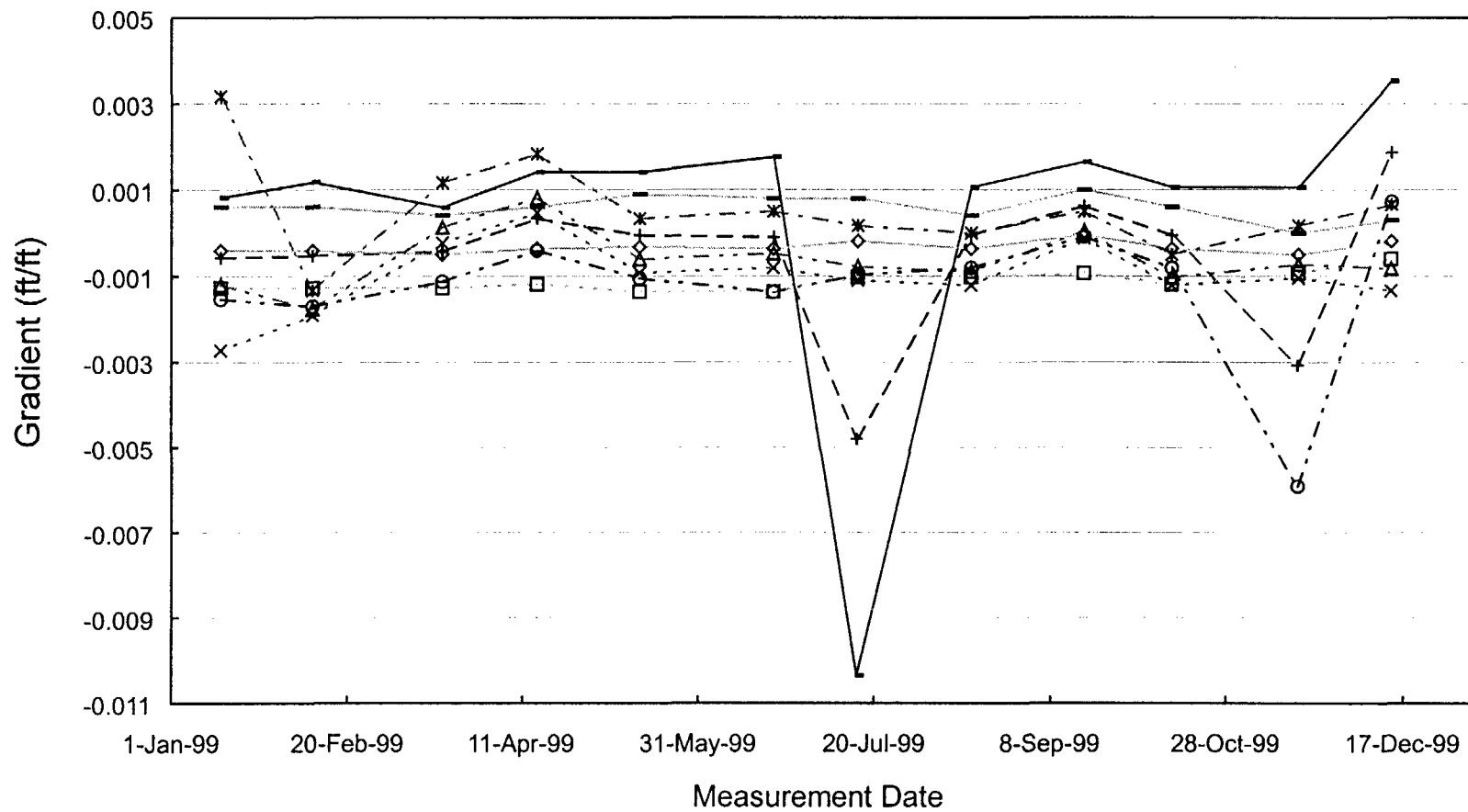
Negative gradient denotes downward flow  
 T = top screen  
 M = middle screen  
 B = bottom screen  
 ft/ft = feet per foot

**JE** JACOBS ENGINEERING

FS-28 Plume  
 Well Clusters 69MW1291,  
 69MW1292, and 69MW1293  
 Vertical Gradients  
 Massachusetts Military Reservation  
 Cape Cod, Massachusetts

8/24/00 ms File...FS28sp99-13.cdr

Figure 4-18



### Legend

-△- 1303T,B	-○- 1304M,B	-◇- 1310T,B
-×- 1303M,B	-+- 1304T,B	-□- 1310M,B
-*- 1303T,M	-●- 1304T,M	-■- 1310T,M

Negative gradient denotes downward flow  
 T = top screen  
 M = middle screen  
 B = bottom screen  
 ft/ft = feet per foot

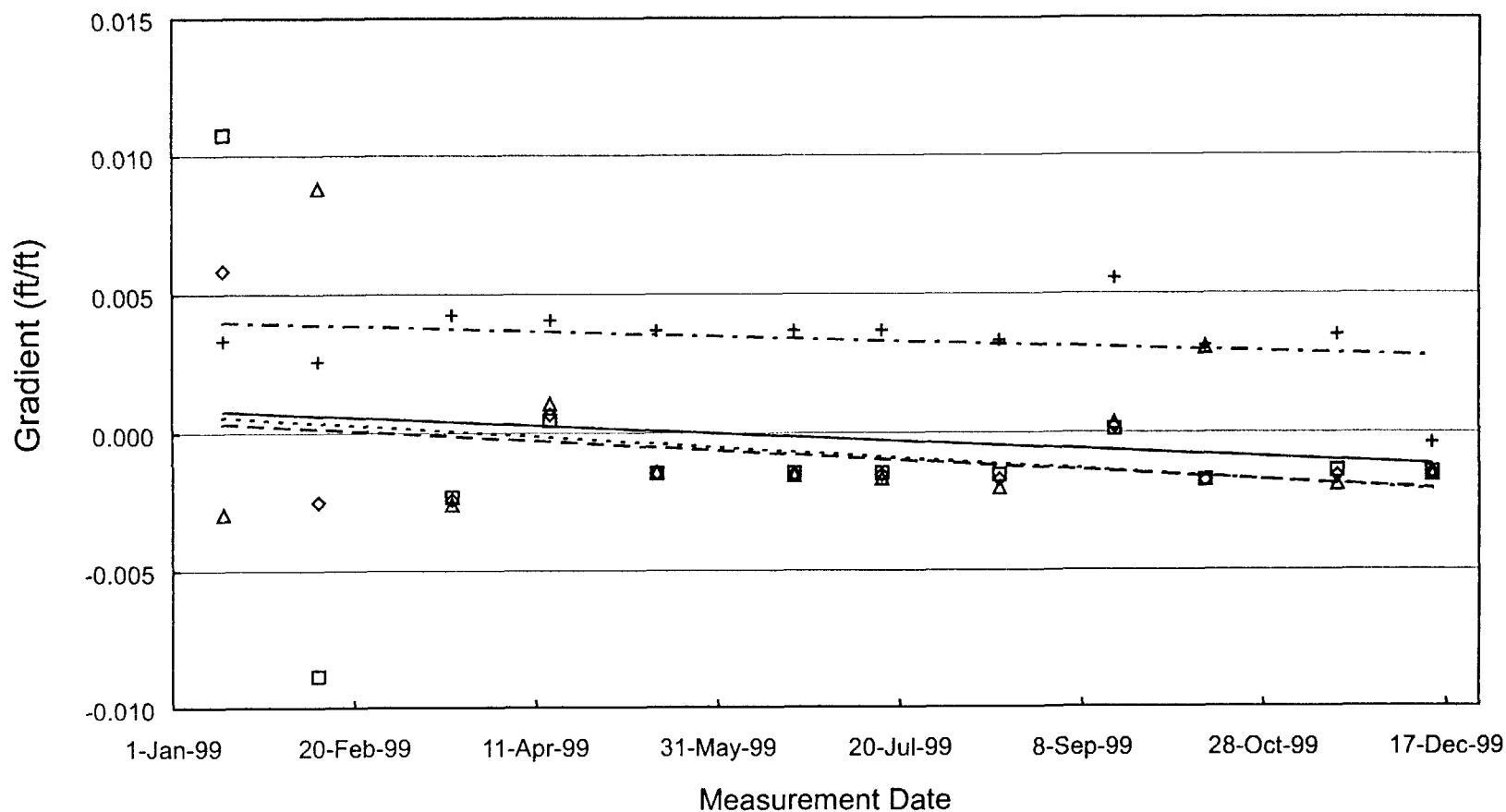


JACOBS ENGINEERING

FS-28 Plume  
 Well Clusters 69MW1303,  
 69MW1304 and 69MW1310  
 Vertical Gradients  
 Massachusetts Military Reservation  
 Cape Cod, Massachusetts

8/24/00 ms File...FS28sp99-10.cdr

Figure 4-19



### Legend

- ◇ 1284T,B ——— Linear (1284T,M)
- 1284M,B ..... Linear (1284T,B)
- △ 1284T,M - - - - Linear (1284M,B)
- + 1290T,B - . - . Linear (1290T,B)

Negative gradient denotes downward flow  
 T = top screen  
 M = middle screen  
 B = bottom screen  
 ft/ft = feet per foot

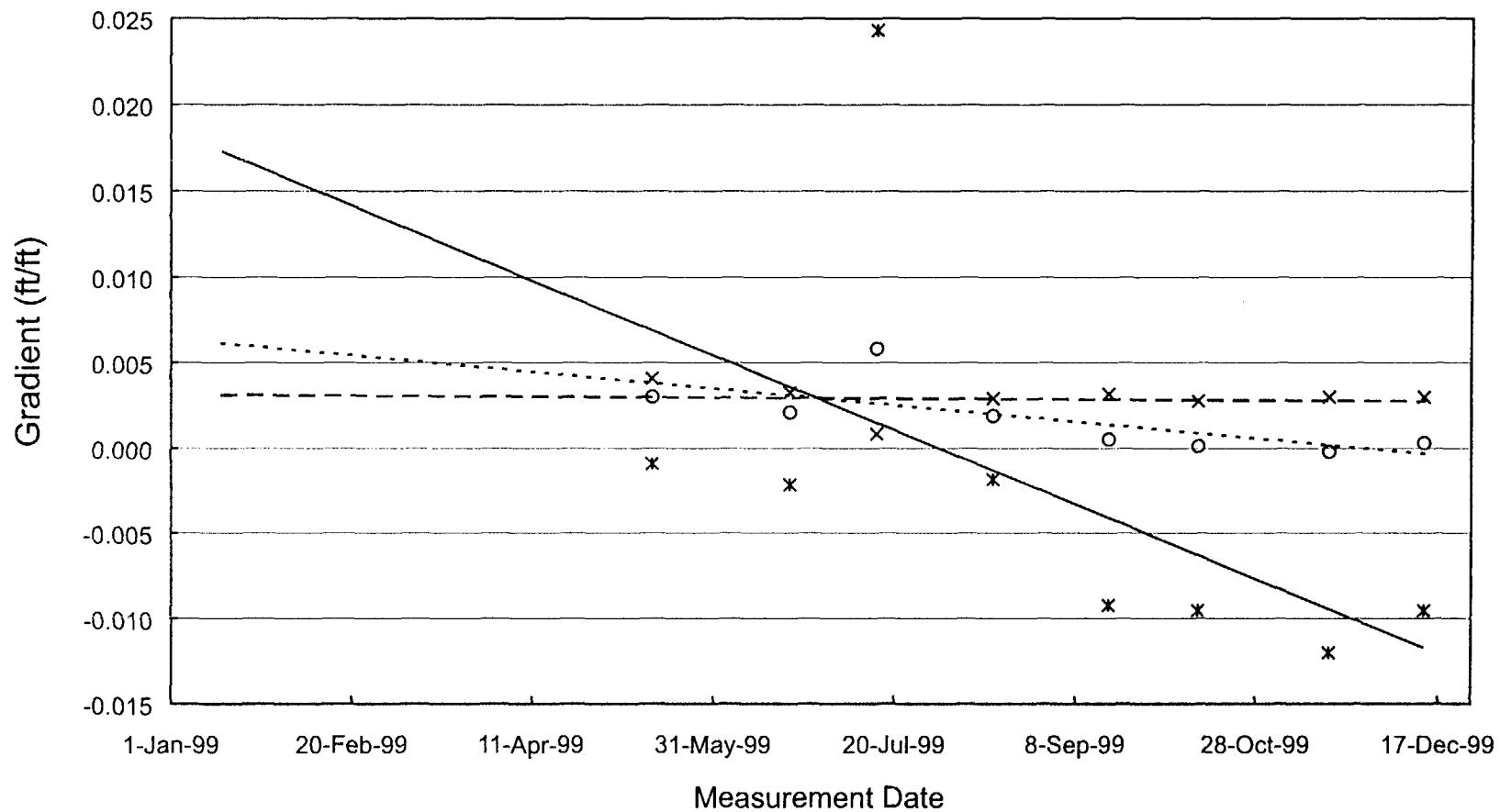


JACOBS ENGINEERING

FS-28 Plume  
 Linear Regression of  
 Vertical Gradients in Well Clusters  
 69MW1284, and 69MW1290  
 Massachusetts Military Reservation  
 Cape Cod, Massachusetts

8/24/00 ms File...FS28sp99-14.cdr

Figure 4-20



### Legend

x 1285M,B    - - - - - Linear (1285T,B)  
 \* 1285T,M    ——— Linear (1285T,M)  
 o 1285T,B    - - - - - Linear (1285M,B)

Negative gradient denotes downward flow  
 T = top screen  
 M = middle screen  
 B = bottom screen  
 ft/ft = feet per foot

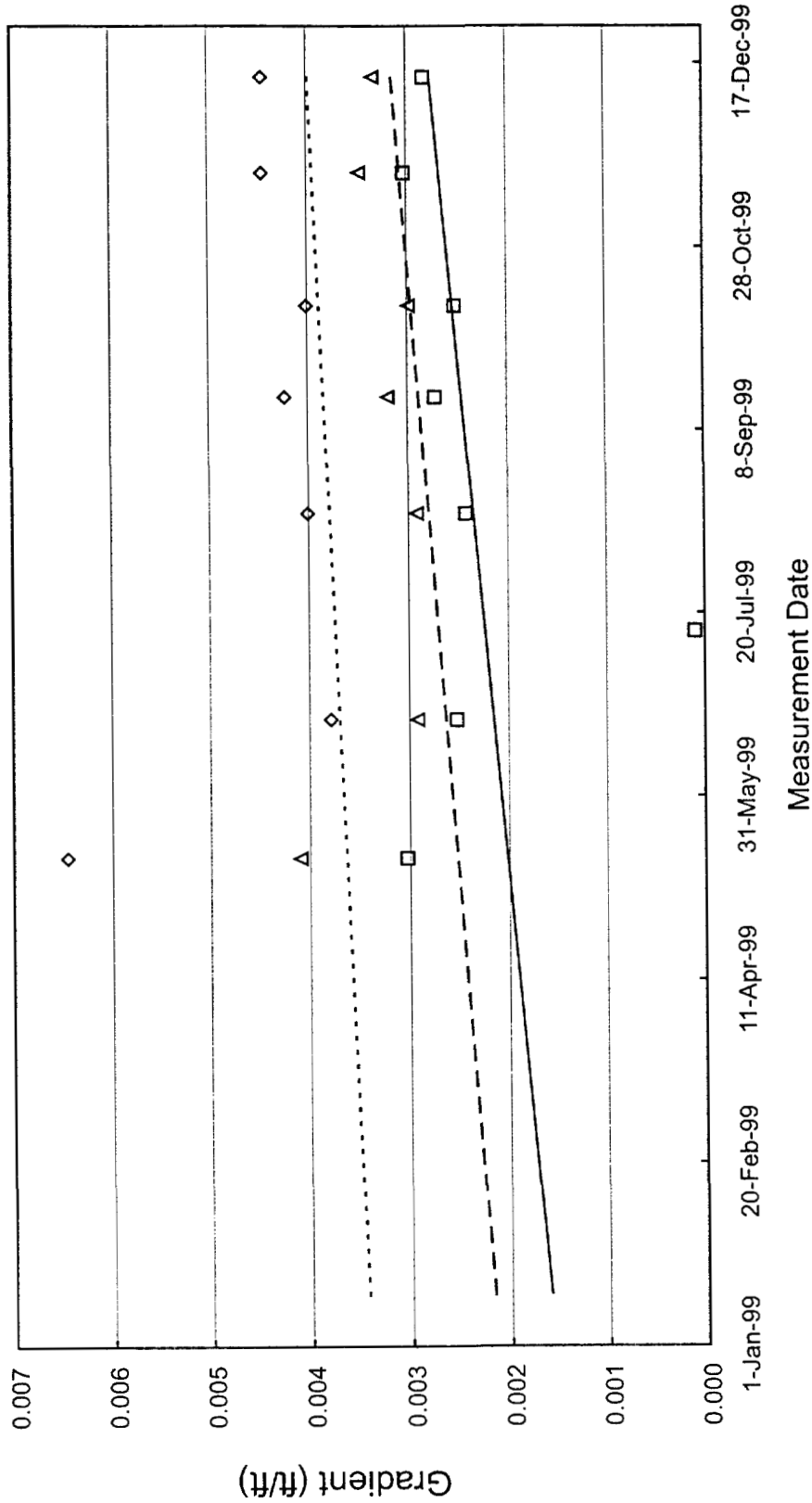


JACOBS ENGINEERING

FS-28 Plume  
 Linear Regression of  
 Vertical Gradients in Well Cluster  
 69MW1285  
 Massachusetts Military Reservation  
 Cape Cod, Massachusetts

8/24/00 ms File...FS28sp99-15.cdr

Figure 4-21



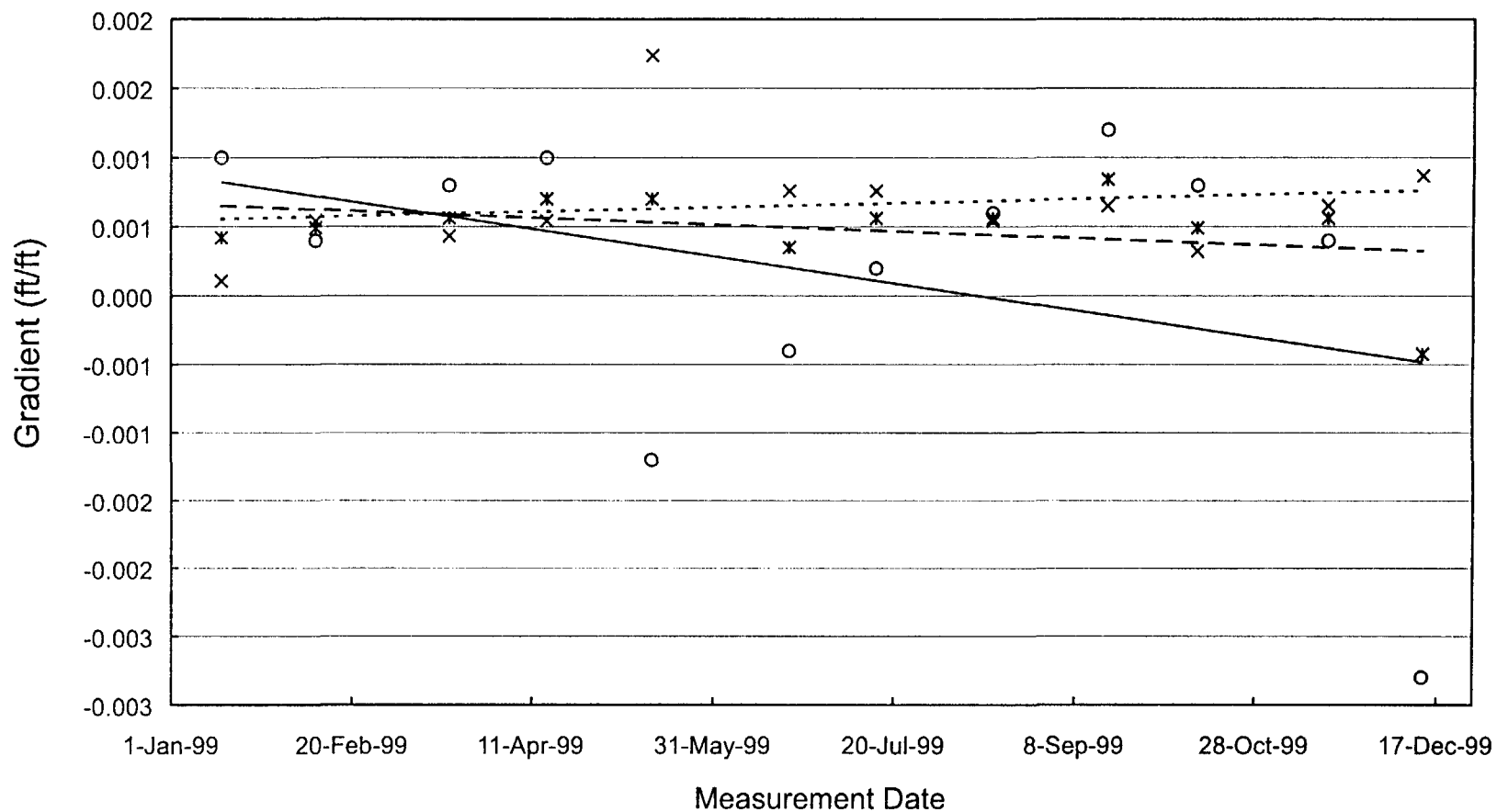
**Legend**

- ◇ 1291M,B Linear (1291M,B)
- 1291T,M Linear (1291T,M)
- △ 1291T,B Linear (1291T,B)

Negative gradient denotes downward flow  
 T = top screen  
 M = middle screen  
 B = bottom screen  
 ft/ft = feet per foot

**JF** JACOBS ENGINEERING

FS-28 Plume  
 Linear Regression of  
 Vertical Gradients in  
 Well Cluster 69MW1291  
 Massachusetts Military Reservation  
 Cape Cod, Massachusetts



### Legend

x 1292M,B    - - - - Linear (1292M,B)  
 \* 1292T,B    - - - - Linear (1292T,B)  
 o 1292T,M    - - - - Linear (1292T,M)

Negative gradient denotes downward flow  
 T = top screen  
 M = middle screen  
 B = bottom screen  
 ft/ft = feet per foot

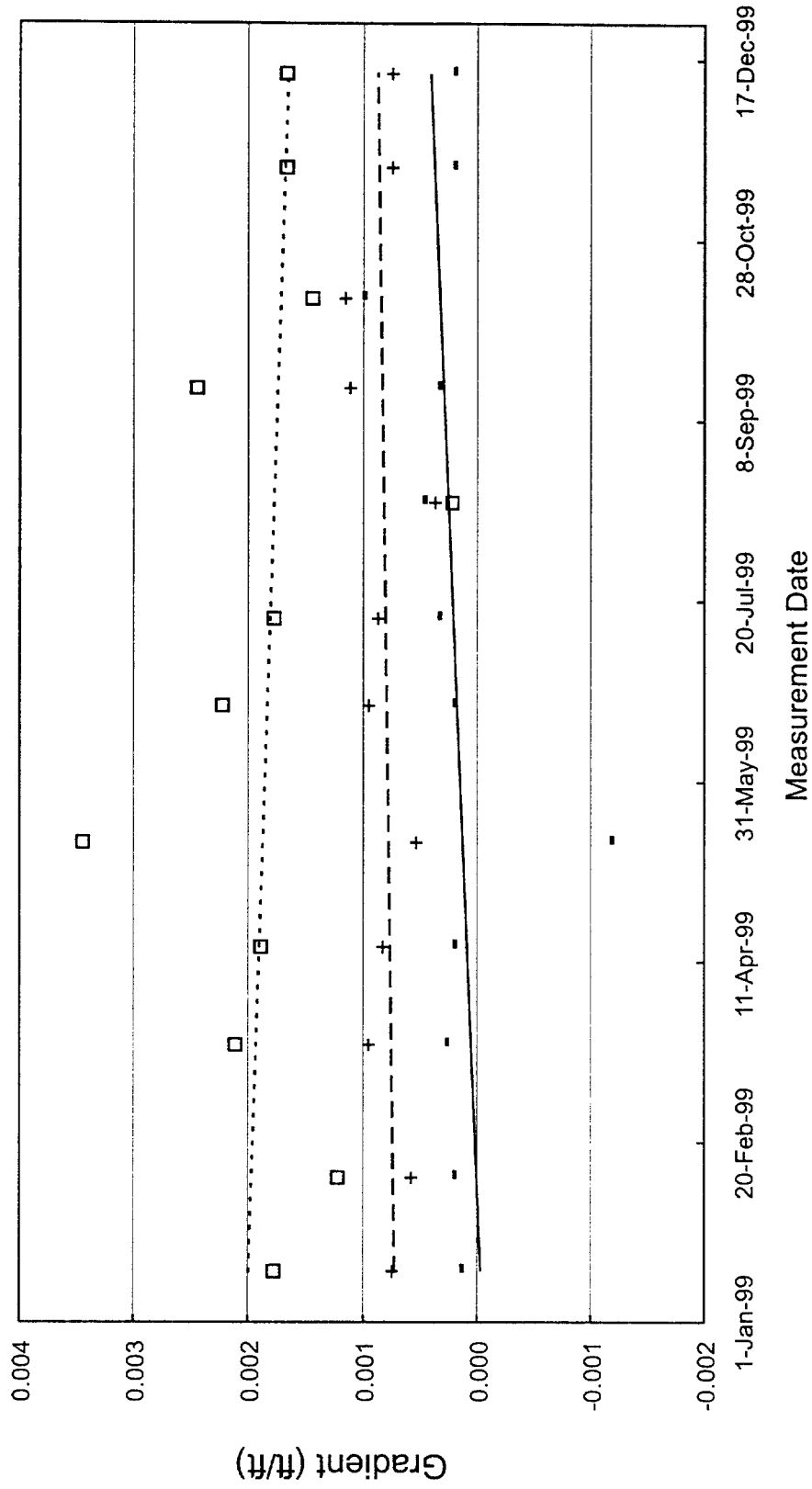


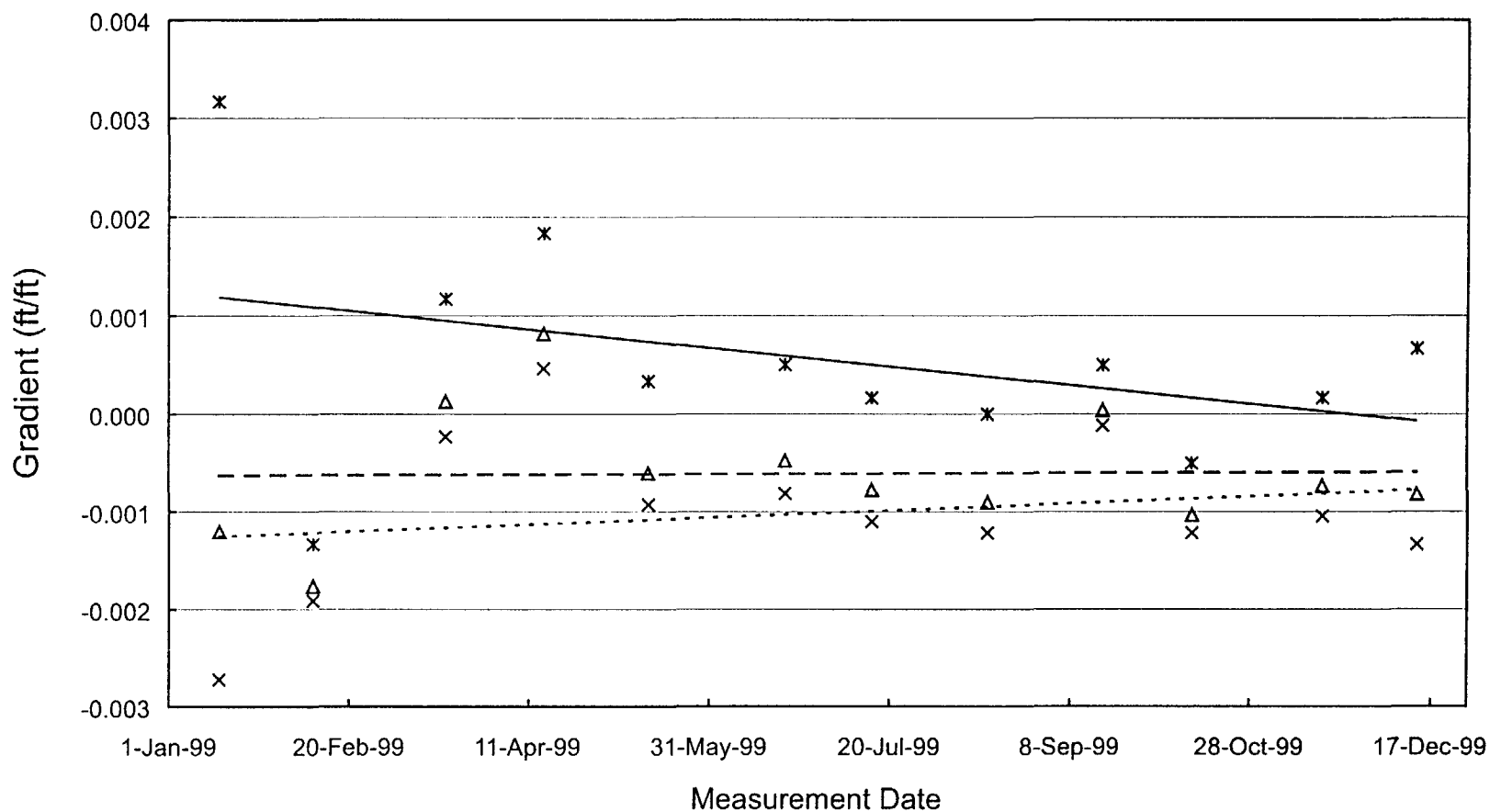
JACOBS ENGINEERING

FS-28 Plume  
 Linear Regression of  
 Vertical Gradients in  
 Well Cluster 69MW1292  
 Massachusetts Military Reservation  
 Cape Cod, Massachusetts

8/24/00 ms File...FS28sp99-17.cdr

Figure 4-23





### Legend

Δ 1303T,B    - - - Linear (1303T,B)  
 × 1303M,B    - - - - Linear (1303M,B)  
 \* 1303T,M    ——— Linear (1303T,M)

Negative gradient denotes downward flow  
 T = top screen  
 M = middle screen  
 B = bottom screen  
 ft/ft = feet per foot

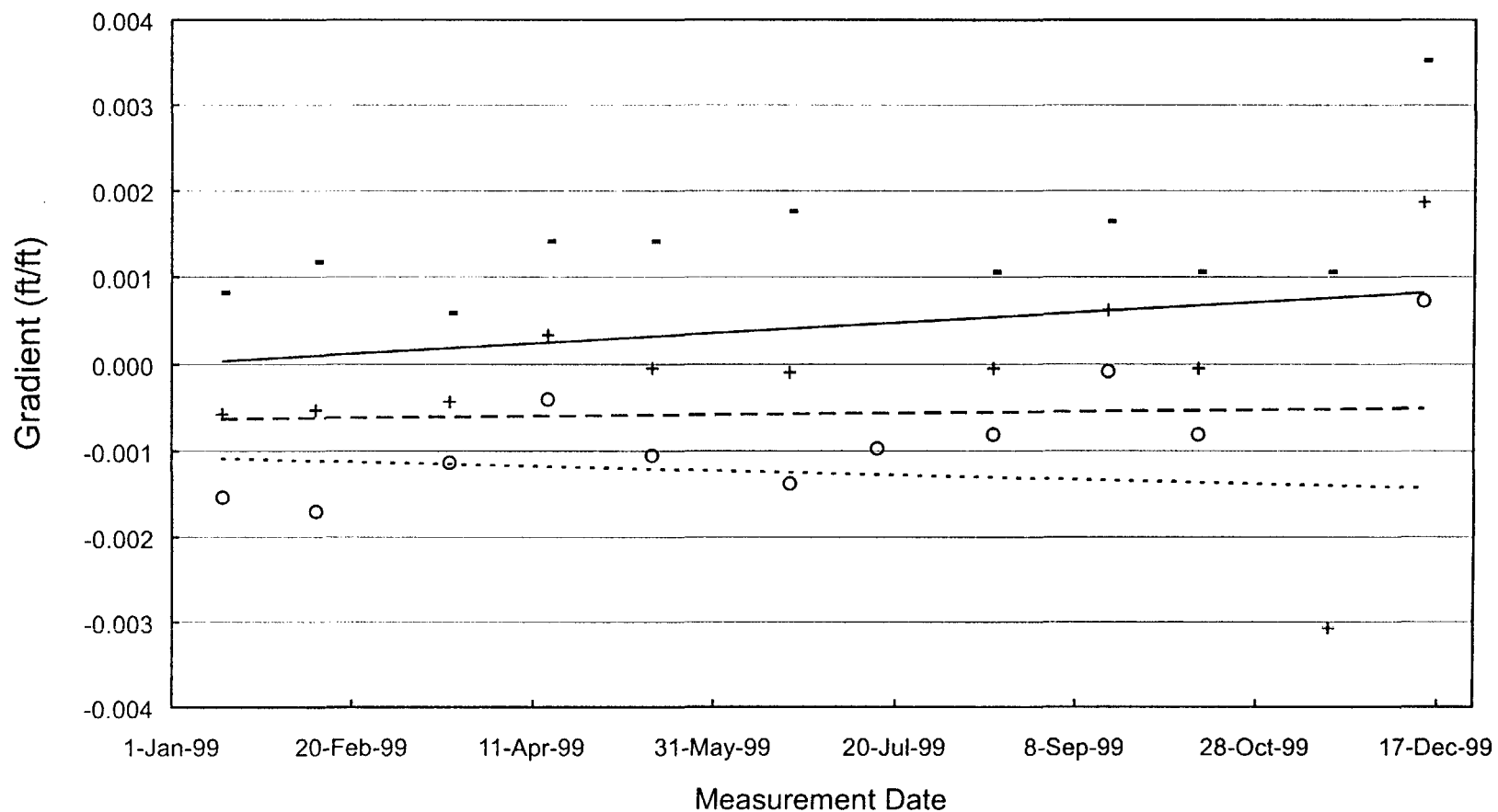


JACOBS ENGINEERING

FS-28 Plume  
 Linear Regression of  
 Vertical Gradients in  
 Well Cluster 69MW1303  
 Massachusetts Military Reservation  
 Cape Cod, Massachusetts

8/24/00 ms File...FS28sp99-11.cdr

Figure 4-25



### Legend

○	1304M,B	-----	Linear (1304M,B)
+	1304T,B	- - - -	Linear (1304T,B)
-	1304T,M	————	Linear (1304T,M)

Negative gradient denotes downward flow  
 T = top screen  
 M = middle screen  
 B = bottom screen  
 ft/ft = feet per foot

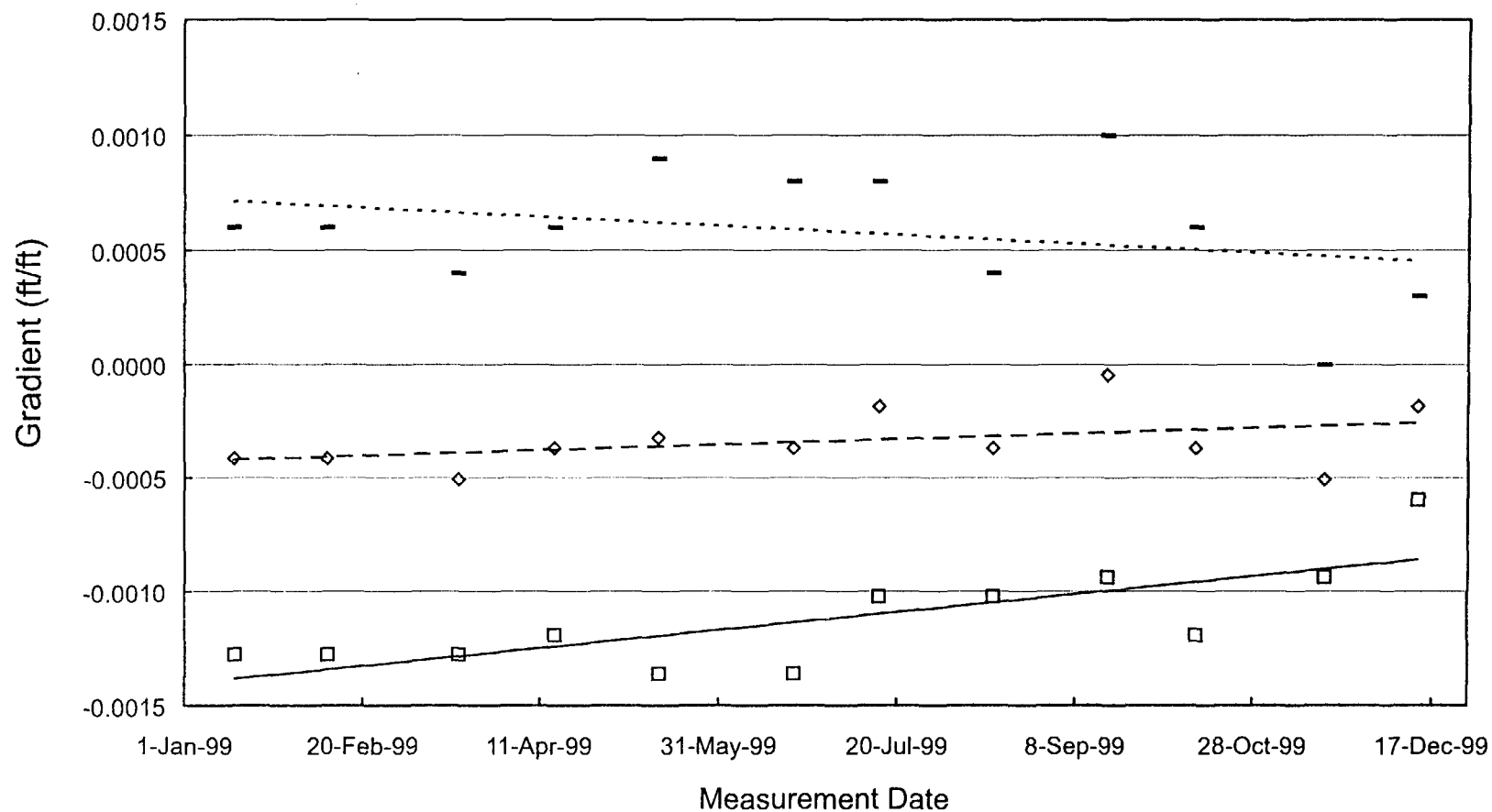


JACOBS ENGINEERING

FS-28 Plume  
 Linear Regression of  
 Vertical Gradients in  
 Well Cluster 69MW1304  
 Massachusetts Military Reservation  
 Cape Cod, Massachusetts

8/24/00 ms File...FS28sp99-19.cdr

Figure 4-26



### Legend

◇	1310T,B	---	Linear (1310T,B)
□	1310M,B	—	Linear (1310M,B)
-	1310T,M	.....	Linear (1310T,M)

Negative gradient denotes downward flow  
T = top screen  
M = middle screen  
B = bottom screen  
ft/ft = feet per foot



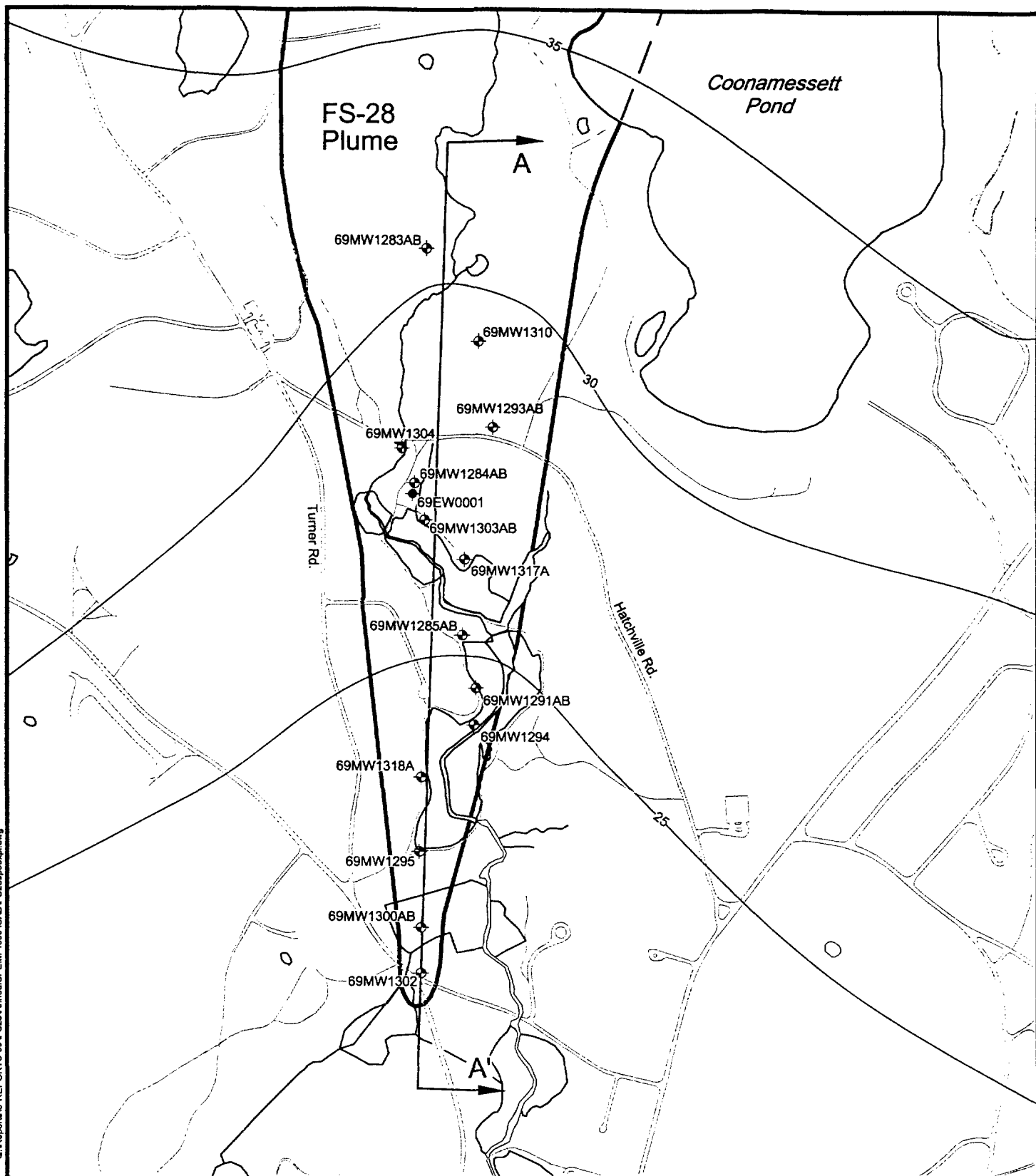
JACOBS ENGINEERING

FS-28 Plume  
Linear Regression of  
Vertical Gradients in  
Well Cluster 69MW1310  
Massachusetts Military Reservation  
Cape Cod, Massachusetts

8/24/00 ms File...FS28sp99-20.cdr

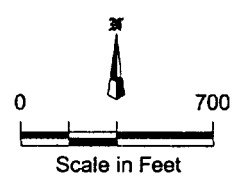
Figure 4-27

last modified: 08/24/00 printed: 08/24/00 by me Q:\Reports\IC-REPORTS\88\FS28\AnnualSPEM-1998\CAD\F528sp99qd.dwg



**Legend**

- Monitoring Well
- Extraction Well
- 35— May 1998 Water Table Contour



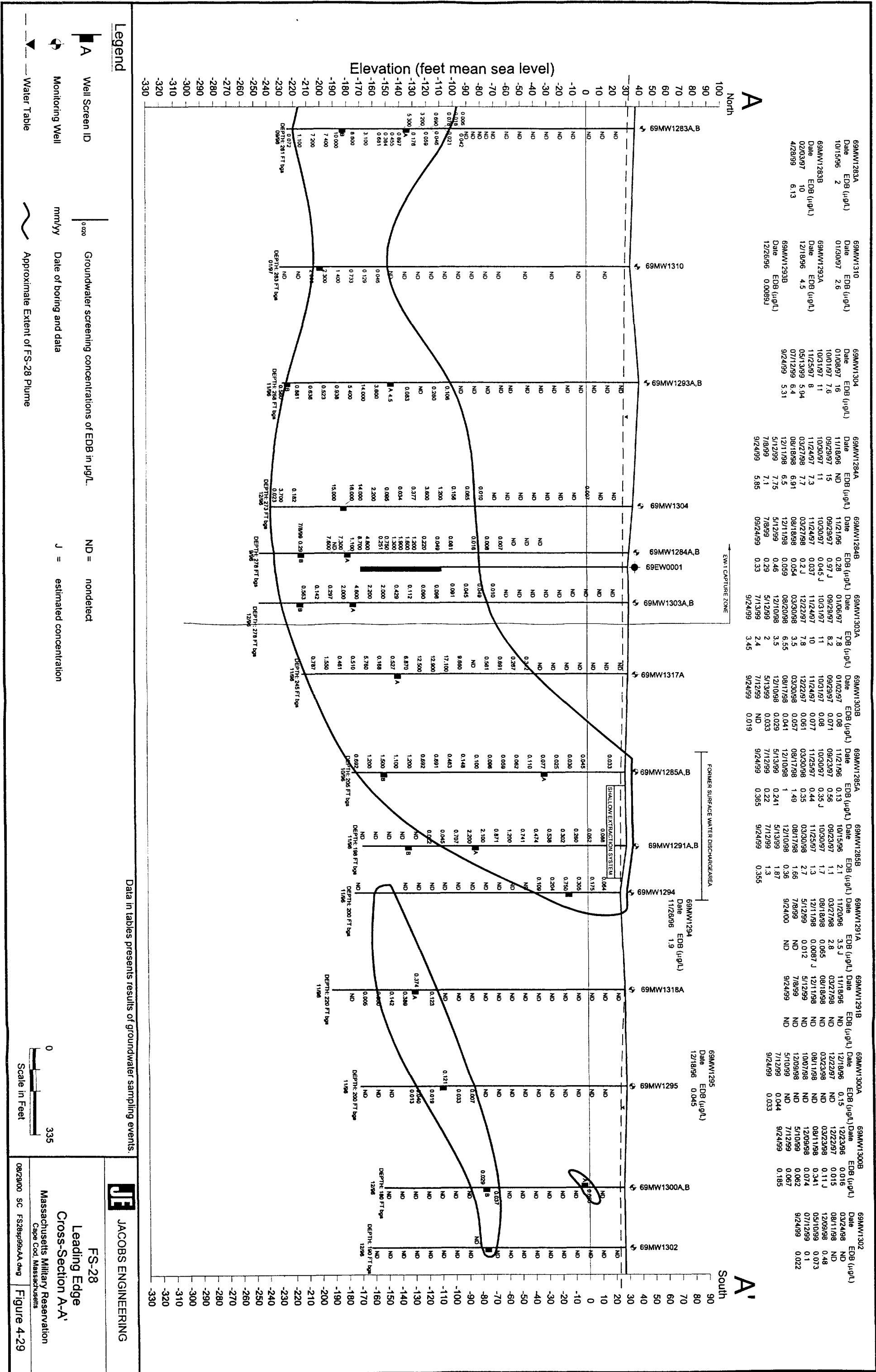
**JE** JACOBS ENGINEERING

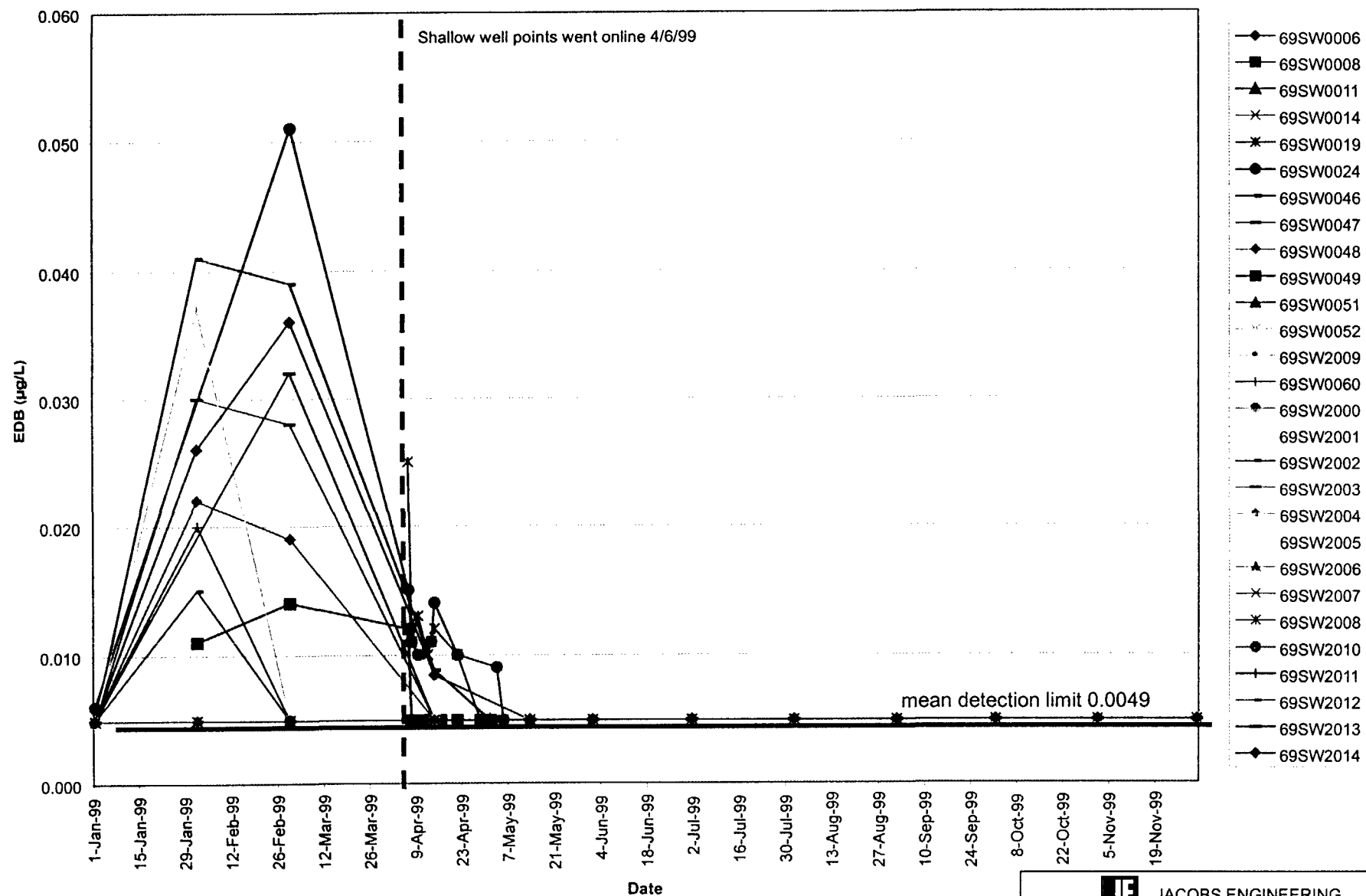
**Leading Edge FS-28  
Cross-Section Line A-A'**

Massachusetts Military Reservation  
Cape Cod, Massachusetts

08/24/00 MS FS28sp99xpl.dwg

Figure 4-28



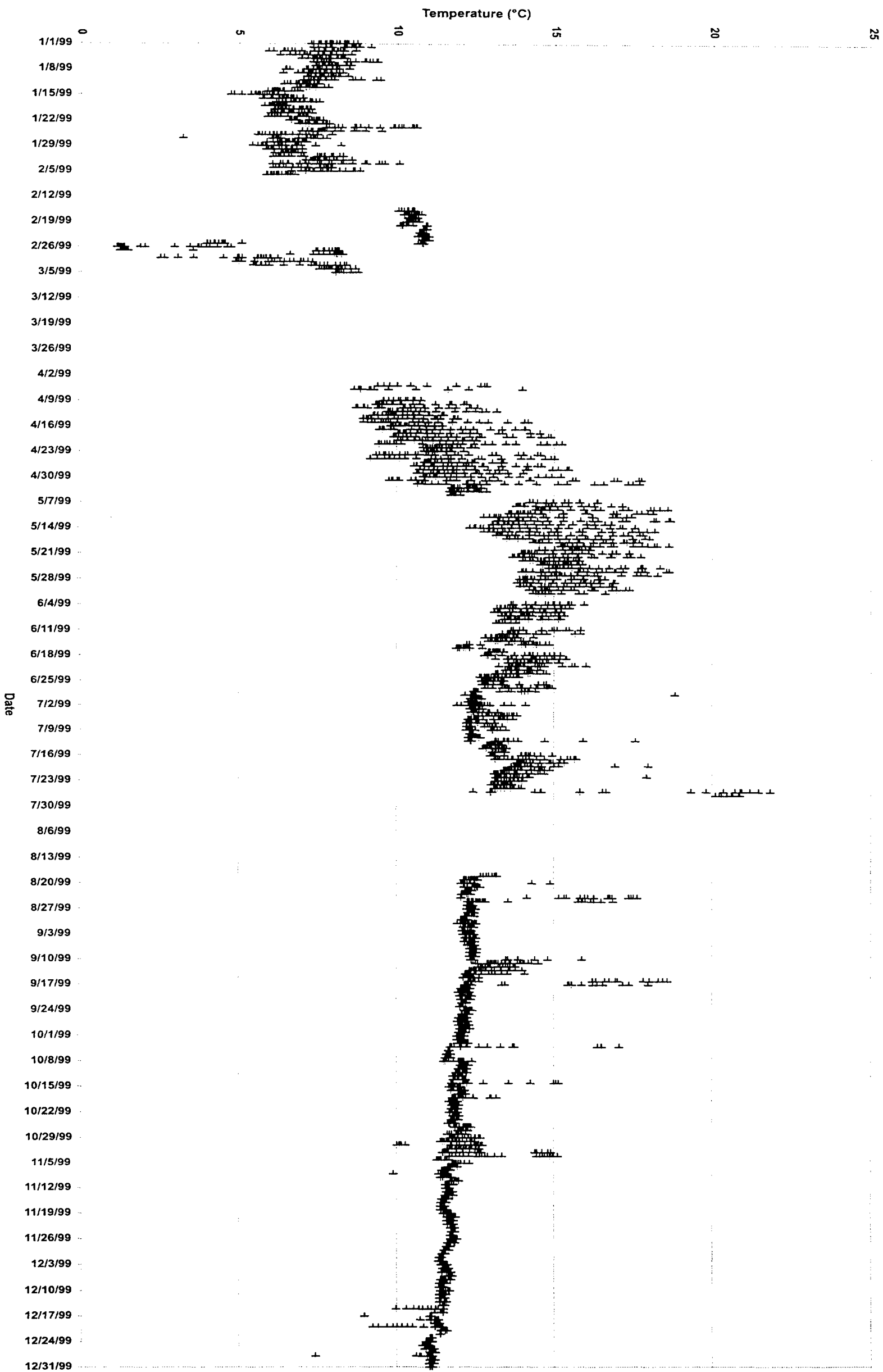


JACOBS ENGINEERING

FS-28 Plume  
Coonamessett River, Broad River,  
and Cranberry Bogs Surface Water  
Ethylene Dibromide Concentrations  
Massachusetts Military Reservation  
Cape Cod, Massachusetts

8/24/00 ms File...FS28sp99-1.cdr

Figure 4-30



Legend



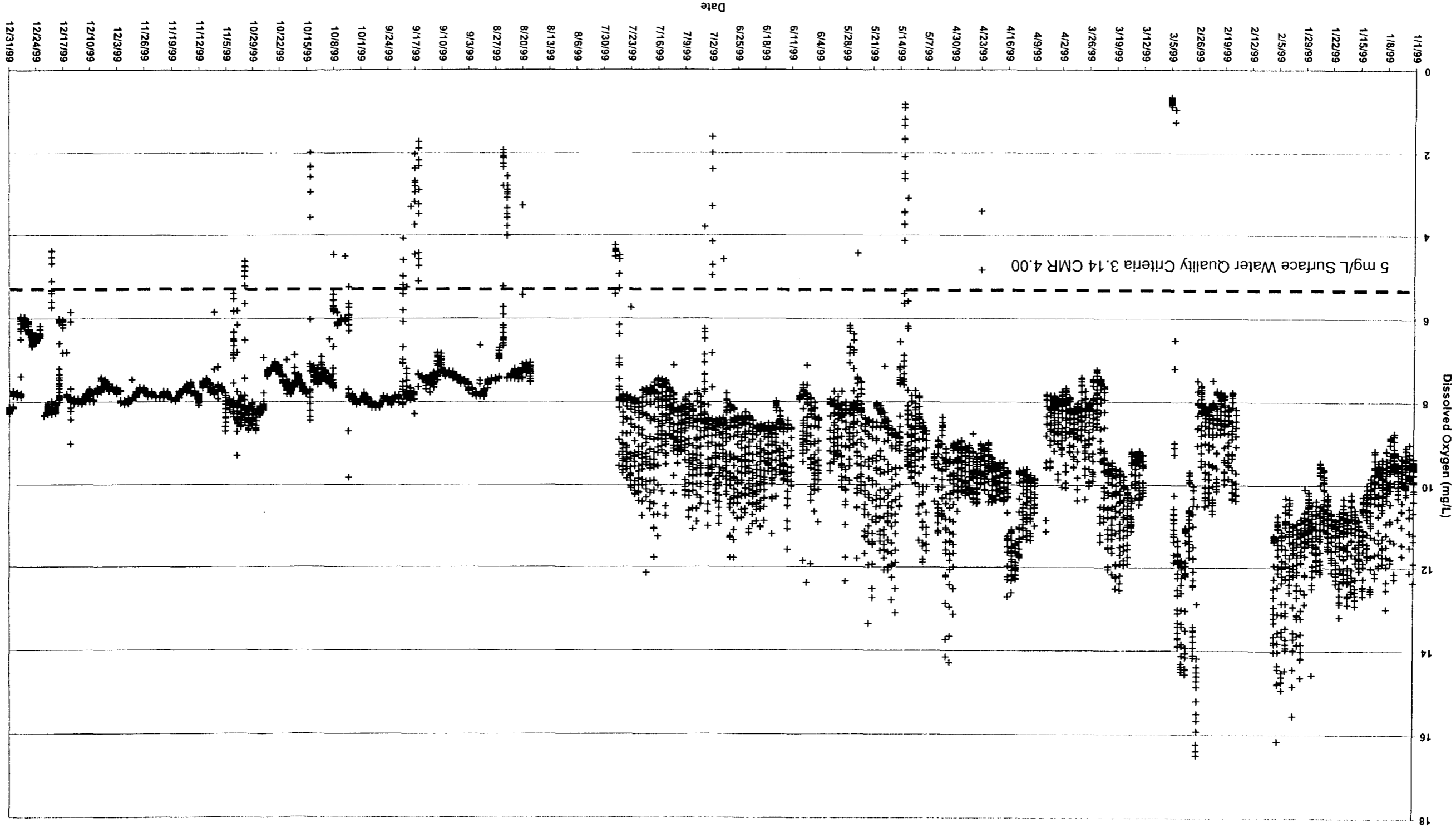
JACOBS ENGINEERING

Hourly Temperature Measurements  
from Location 69SW0065  
January - December 1999  
Massachusetts Military Reservation  
Cape Cod, Massachusetts

8/24/00 ms File...FS28ap99-30.cdr

Figure 4-31

Legend



JACOB ENGINEERING

**Table 2-1**  
**FS-28 Shallow Well-Point System Construction Details**

<b>Location</b>	<b>Northing</b>	<b>Easting</b>	<b>Surface Elev. (ft msl)</b>	<b>Total Depth (ft bgs)</b>	<b>TOC Elev. (ft msl)</b>	<b>Elev. Screen Top (ft msl)</b>	<b>Elev. Screen Bottom (ft msl)</b>	<b>Screen Length (feet)</b>	<b>Completion Date</b>	<b>Well Status</b>
69EW3001	223472.62	853580.87	26.25	13	26.89	16.35	14.05	2.3	10/30/1998	ON
69EW3002	223462.52	853581.17	26.25	13	27.01	16.15	13.85	2.3	10/30/1998	ON
69EW3003	223452.28	853581.68	26.25	13	27.06	16.05	13.75	2.3	10/30/1998	ON
69EW3004	223441.98	853582.07	26.25	13	26.98	16.05	13.75	2.3	10/30/1998	ON
69EW3005	223432.13	853581.95	26.25	13	27.04	16.05	13.75	2.3	10/30/1998	ON
69EW3006	223422.52	853582.44	26.25	13	27.1	16.05	13.75	2.3	10/29/1998	ON
69EW3007	223472.22	853570.59	26.25	13	27.09	16.05	13.75	2.3	10/30/1998	ON
69EW3008	223462.25	853570.8	26.25	13	27.05	16.05	13.75	2.3	10/30/1998	ON
69EW3009	223452.24	853571.78	26.25	13	26.99	16.05	13.75	2.3	10/30/1998	ON
69EW3010	223441.8	853571.71	26.25	13	27.03	16.05	13.75	2.3	10/30/1998	ON
69EW3011	223431.94	853571.98	26.25	13	26.94	16.05	13.75	2.3	10/30/1998	ON
69EW3012	223422.43	853572.12	26.25	13	26.95	16.05	13.75	2.3	10/29/1998	ON
69EW3013	223471.95	853560.62	26.25	13	27.05	16.05	13.75	2.3	10/30/1998	ON
69EW3014	223461.82	853561.09	26.25	13	27.11	16.05	13.75	2.3	10/30/1998	ON
69EW3015	223451.59	853561.54	26.25	13	27.12	16.05	13.75	2.3	10/30/1998	ON
69EW3016	223441.5	853561.54	26.25	13	27.05	16.05	13.75	2.3	10/30/1998	ON
69EW3017	223431.51	853561.86	26.25	13	27.12	16.05	13.75	2.3	10/30/1998	ON
69EW3018	223421.73	853562.14	26.25	13	26.95	16.05	13.75	2.3	10/29/1998	ON
69EW3019	223471.76	853550.7	26.25	13	27.15	16.05	13.75	2.3	10/30/1998	ON
69EW3020	223461.13	853550.94	26.25	13	27.08	16.05	13.75	2.3	10/30/1998	ON
69EW3021	223451.41	853551.31	26.25	13	27.1	16.05	13.75	2.3	10/30/1998	ON
69EW3022	223441.35	853551.73	26.25	13	26.98	16.35	14.05	2.3	10/30/1998	ON
69EW3023	223431.38	853551.95	26.25	13	27.11	16.05	13.75	2.3	10/30/1998	ON
69EW3024	223421.67	853552.37	26.25	13	26.97	16.05	13.75	2.3	10/29/1998	ON
69EW3025	223470.97	853541.04	26.25	13	27.06	16.05	13.75	2.3	10/30/1998	ON

**Table 2-1**  
**FS-28 Shallow Well-Point System Construction Details**

Location	Northing	Easting	Surface Elev. (ft msl)	Total Depth (ft bgs)	TOC Elev. (ft msl)	Elev. Screen Top (ft msl)	Elev. Screen Bottom (ft msl)	Screen Length	Completion Date	Comment
69EW3026	223461.33	853541.08	26.25	13	26.95	16.05	13.75	2.3	10/30/1998	ON
69EW3027	223450.94	853541.48	26.25	13	27.13	16.05	13.75	2.3	10/30/1998	ON
69EW3028	223440.97	853541.7	26.25	13	26.98	16.05	13.75	2.3	10/30/1998	ON
69EW3029	223431.09	853541.98	26.25	13	26.97	16.05	13.75	2.3	10/30/1998	ON
69EW3030	223421.58	853541.97	26.25	13	27.08	16.05	13.75	2.3	10/30/1998	ON
69EW3031	223470.68	853530.79	26.25	13	26.97	16.05	13.75	2.3	10/29/1998	ON
69EW3032	223460.03	853530.91	26.25	13	27.18	16.05	13.75	2.3	10/30/1998	ON
69EW3033	223450.98	853530.94	26.25	13	27.52	16.35	14.05	2.3	10/30/1998	ON
69EW3034	223440.93	853531.45	26.25	13	27.09	15.95	13.65	2.3	10/30/1998	ON
69EW3035	223430.93	853531.47	26.25	13	27	16.05	13.75	2.3	10/30/1998	ON
69EW3036	223421.28	853531.69	26.25	13	27.11	16.05	13.75	2.3	10/29/1998	ON
69EW3037	223411.08	853533.42	26.25	12.75	27.4	16.75	13.75	3	02/10/1999	ON
69EW3038	223411.13	853541.68	26.25	12.75	27.1	16.75	13.75	3	02/10/1999	ON
69EW3039	223411.25	853551.64	26.25	12.75	27.32	16.75	13.75	3	02/10/1999	ON
69EW3040	223411.55	853561.88	26.25	12.75	27.15	16.75	13.75	3	02/10/1999	ON
69EW3041	223411.86	853572.18	26.25	12.75	27.05	16.75	13.75	3	02/10/1999	ON
69EW3042	223412.11	853582.44	26.25	12.75	27.25	16.75	13.75	3	02/10/1999	ON
69EW3043	223402.2	853582.72	26.25	12.75	27.03	16.75	13.75	3	02/10/1999	ON
69EW3044	223402.05	853572.38	26.25	12.75	26.99	16.75	13.75	3	02/10/1999	ON
69EW3045	223401.97	853561.53	26.25	12.75	26.94	16.75	13.75	3	02/10/1999	ON
69EW3046	223401.59	853551.7	26.25	12.75	26.87	16.75	13.75	3	02/10/1999	ON
69EW3047	223401.69	853541.85	26.25	12.75	26.85	16.75	13.75	3	02/10/1999	ON
69EW3048	223401.65	853531.54	26.25	12.75	26.88	16.75	13.75	3	02/10/1999	ON
69EW3049	223391.53	853532.14	26.25	12.75	27.69	16.75	13.75	3	02/10/1999	ON
69EW3050	223391.87	853541.71	26.25	12.75	27.08	16.75	13.75	3	02/10/1999	ON

**Table 2-1**  
**FS-28 Shallow Well-Point System Construction Details**

Location	Northing	Easting	Surface Elev. (ft msl)	Total Depth (ft bgs)	TOC Elev. (ft msl)	Elev. Screen Top (ft msl)	Elev. Screen Bottom (ft msl)	Screen Length (feet)	Completion Date	Comment
69EW3051	223391.04	853551.99	26.25	12.75	26.78	16.75	13.75	3	02/10/1999	ON
69EW3052	223391.73	853561.99	26.25	12.75	26.71	16.75	13.75	3	02/10/1999	ON
69EW3053	223391.47	853572.28	26.25	12.75	26.83	16.75	13.75	3	02/10/1999	ON
69EW3054	223392.07	853583.49	26.25	12.75	26.83	16.75	13.75	3	02/10/1999	ON
69EW3055	223381.4	853552	26.25	12.75	27.12	16.75	13.75	3	02/10/1999	OFF
69EW3056	223381.36	853542.26	26.25	12.75	27.13	16.75	13.75	3	02/10/1999	OFF
69EW3057	223381.65	853532.75	26.25	12.75	27.34	16.75	13.75	3	02/10/1999	OFF
69EW3058	223372.66	853584	26.25	12.75	26.89	16.75	13.75	3	02/10/1999	OFF
69EW3059	223372.31	853572.82	26.25	12.75	27.08	16.75	13.75	3	02/10/1999	OFF
69EW3060	223372.11	853562.33	26.25	12.75	26.81	16.75	13.75	3	02/10/1999	OFF
69EW3061	223371.75	853552.42	26.25	12.75	26.99	16.75	13.75	3	02/10/1999	OFF
69EW3062	223371.42	853542.51	26.25	12.75	26.88	16.75	13.75	3	02/10/1999	OFF
69EW3063	223370.93	853532.34	26.25	12.75	26.99	16.75	13.75	3	02/10/1999	OFF
69EW3064	223360.83	853532.27	26.25	12.75	26.83	16.75	13.75	3	02/10/1999	OFF
69EW3065	223361.84	853542.37	26.25	12.75	26.99	16.75	13.75	3	02/10/1999	OFF
69EW3066	223361.49	853552.68	26.25	12.75	26.94	16.75	13.75	3	02/10/1999	OFF
69EW3067	223361.79	853562.23	26.25	12.75	26.87	16.75	13.75	3	02/10/1999	OFF
69EW3068	223362.2	853572.59	26.25	12.75	26.81	16.75	13.75	3	02/10/1999	OFF
69EW3069	223362.16	853583.99	26.25	12.75	26.92	16.75	13.75	3	02/10/1999	OFF
69EW3070	223353.77	853644.65	26.25	12.75	26.5	16.75	13.75	3	02/10/1999	OFF
69EW3071	223353.55	853634.6	26.25	12.75	26.85	16.75	13.75	3	02/10/1999	OFF
69EW3072	223353.31	853624.75	26.25	12.75	27.26	16.75	13.75	3	02/10/1999	OFF
69EW3073	223352.84	853614.18	26.25	12.75	27.17	16.75	13.75	3	02/10/1999	OFF
69EW3074	223352.58	853604.7	26.25	12.75	27.11	16.75	13.75	3	02/10/1999	OFF
69EW3075	223352.57	853594.52	26.25	12.75	27.13	16.75	13.75	3	02/10/1999	OFF

**Table 2-1**  
**FS-28 Shallow Well-Point System Construction Details**

Location	Northing	Easting	Surface Elev. (ft msl)	Total Depth (ft bgs)	TOC Elev. (ft msl)	Elev. Screen Top (ft msl)	Elev. Screen Bottom (ft msl)	Screen Length (feet)	Completion Date	Comment
69EW3076	223352.6	853584.53	26.25	12.75	27.11	16.75	13.75	3	02/10/1999	OFF
69EW3077	223352.11	853572.77	26.25	12.75	26.86	16.75	13.75	3	02/10/1999	OFF
69EW3078	223352.09	853562.78	26.25	12.75	26.89	16.75	13.75	3	02/11/1999	OFF
69EW3079	223351.32	853552.75	26.25	12.75	26.96	16.75	13.75	3	02/11/1999	OFF
69EW3080	223351.32	853542.88	26.25	12.75	27.11	16.75	13.75	3	02/11/1999	OFF
69EW3081	223350.84	853532.4	26.25	12.75	27.02	16.75	13.75	3	02/11/1999	OFF
69EW3082	223341.48	853532.56	26.25	12.75	27.15	16.75	13.75	3	02/11/1999	OFF
69EW3083	223341.62	853542.49	26.25	12.75	26.99	16.75	13.75	3	02/11/1999	OFF
69EW3084	223341.86	853552.5	26.25	12.75	27.08	16.75	13.75	3	02/11/1999	OFF
69EW3085	223342.32	853563.04	26.25	12.75	27.08	16.75	13.75	3	02/11/1999	OFF
69EW3086	223342.37	853572.9	26.25	12.75	27.07	16.75	13.75	3	02/11/1999	OFF
69EW3087	223342.58	853584.75	26.25	12.75	26.91	16.75	13.75	3	02/11/1999	OFF
69EW3088	223343.17	853595.03	26.25	12.75	26.88	16.75	13.75	3	02/11/1999	OFF
69EW3089	223343.08	853604.83	26.25	12.75	26.96	16.75	13.75	3	02/11/1999	OFF
69EW3090	223343.42	853614.75	26.25	12.75	27.02	16.75	13.75	3	02/11/1999	OFF
69EW3091	223343.82	853624.12	26.25	12.75	27.03	16.75	13.75	3	02/11/1999	OFF
69EW3092	223343.94	853634.8	26.25	12.75	26.58	16.75	13.75	3	02/11/1999	OFF
69EW3093	223344.02	853645.08	26.25	12.75	26.73	16.75	13.75	3	02/11/1999	OFF
69EW3094	223333.62	853645.42	26.25	12.75	26.84	16.75	13.75	3	02/11/1999	OFF
69EW3095	223333.84	853634.83	26.25	12.75	26.82	16.75	13.75	3	02/11/1999	OFF
69EW3096	223333.56	853624.8	26.25	12.75	26.8	16.75	13.75	3	02/11/1999	OFF
69EW3097	223333.12	853614.64	26.25	12.75	27.07	16.75	13.75	3	02/11/1999	OFF
69EW3098	223332.8	853604.73	26.25	12.75	27.28	16.75	13.75	3	02/11/1999	OFF
69EW3099	223333.11	853595.12	26.25	12.75	27.05	16.75	13.75	3	02/11/1999	OFF
69EW3100	223332.35	853584.64	26.25	12.75	27.1	16.75	13.75	3	02/11/1999	OFF

**Table 2-1**  
**FS-28 Shallow Well-Point System Construction Details**

Location	Northing	Easting	Surface Elev. (ft msl)	Total Depth (ft bgs)	TOC Elev. (ft msl)	Elev. Screen Top (ft msl)	Elev. Screen Bottom (ft msl)	Screen Length (feet)	Completion Date	Comment
69EW3101	223332.38	853573.65	26.25	12.75	26.96	16.75	13.75	3	02/11/1999	OFF
69EW3102	223331.96	853563.44	26.25	12.75	27.03	16.75	13.75	3	02/11/1999	OFF
69EW3103	223332.25	853552.67	26.25	12.75	27.41	16.75	13.75	3	02/11/1999	OFF
69EW3104	223331.45	853543.53	26.25	12.75	27.44	16.75	13.75	3	02/11/1999	OFF
69EW3105	223331.11	853532.54	26.25	12.75	27.16	16.75	13.75	3	02/11/1999	OFF
69EW3106	223321.12	853532.53	26.25	12.75	27.11	16.75	13.75	3	02/11/1999	OFF
69EW3107	223322.07	853542.93	26.25	12.75	27.35	16.75	13.75	3	02/11/1999	OFF
69EW3108	223322.22	853552.97	26.25	12.75	27.19	16.75	13.75	3	02/11/1999	OFF
69EW3109	223321.96	853563.3	26.25	12.75	27.18	16.75	13.75	3	02/11/1999	OFF
69EW3110	223322.08	853573.88	26.25	12.75	27.03	16.75	13.75	3	02/11/1999	OFF
69EW3111	223322.5	853585.35	26.25	12.75	26.81	16.75	13.75	3	02/11/1999	OFF
69EW3112	223322.55	853594.9	26.25	12.75	26.88	16.75	13.75	3	02/11/1999	OFF
69EW3113	223322.96	853604.76	26.25	12.75	26.91	16.75	13.75	3	02/11/1999	OFF
69EW3114	223323.22	853614.73	26.25	12.75	27.05	16.75	13.75	3	02/11/1999	OFF
69EW3115	223323.33	853625.33	26.25	12.75	26.66	16.75	13.75	3	02/11/1999	OFF
69EW3116	223323.67	853635.17	26.25	12.75	26.89	16.75	13.75	3	02/11/1999	OFF
69EW3117	223323.62	853645.48	26.25	12.75	26.82	16.75	13.75	3	02/11/1999	OFF
69EW3118	223313.62	853645.54	26.25	12.75	26.72	16.75	13.75	3	02/11/1999	OFF
69EW3119	223313.43	853634.93	26.25	12.75	26.68	16.75	13.75	3	02/12/1999	OFF
69EW3120	223313.54	853625.06	26.25	12.75	26.95	16.75	13.75	3	02/12/1999	OFF
69EW3121	223312.89	853615.38	26.25	12.75	26.74	16.75	13.75	3	02/12/1999	OFF
69EW3122	223312.77	853605.1	26.25	12.75	26.93	16.75	13.75	3	02/12/1999	OFF
69EW3123	223312.55	853595.04	26.25	12.75	26.75	16.75	13.75	3	02/12/1999	OFF
69EW3124	223312.42	853585.76	26.25	12.75	26.74	16.75	13.75	3	02/12/1999	OFF
69EW3125	223312.47	853573.86	26.25	12.75	27.42	16.75	13.75	3	02/12/1999	OFF

**Table 2-1**  
**FS-28 Shallow Well-Point System Construction Details**

Location	Northing	Easting	Surface Elev. (ft msl)	Total Depth (ft bgs)	TOC Elev. (ft msl)	Elev. Screen Top (ft msl)	Elev. Screen Bottom (ft msl)	Screen Length (feet)	Completion Date	Comment
69EW3126	223312.26	853563.16	26.25	12.75	27.38	16.75	13.75	3	02/12/1999	OFF
69EW3127	223311.91	853553.12	26.25	12.75	27.36	16.75	13.75	3	02/12/1999	OFF
69EW3128	223311.5	853543.19	26.25	12.75	27.37	16.75	13.75	3	02/12/1999	OFF
69EW3129	223301.77	853553.24	26.25	12.75	27.53	16.75	13.75	3	02/12/1999	OFF
69EW3130	223302.54	853563.44	26.25	12.75	27.43	16.75	13.75	3	02/12/1999	OFF
69EW3131	223302.17	853574.56	26.25	12.75	27.11	16.75	13.75	3	02/12/1999	OFF
69EW3132	223302.82	853585.95	26.25	12.75	26.93	16.75	13.75	3	02/12/1999	OFF
69EW3133	223302.84	853595.78	26.25	12.75	26.98	16.75	13.75	3	02/12/1999	OFF
69EW3134	223302.9	853605.13	26.25	12.75	26.59	16.75	13.75	3	02/12/1999	OFF
69EW3135	223303.22	853615.15	26.25	12.75	26.68	16.75	13.75	3	02/12/1999	OFF
69EW3136	223303.35	853625.34	26.25	12.75	26.74	16.75	13.75	3	02/12/1999	OFF
69EW3137	223303.61	853635.04	26.25	12.75	26.19	16.75	13.75	3	02/12/1999	OFF
69EW3138	223293.67	853645.82	26.25	12.75	26.4	16.75	13.75	3	02/12/1999	OFF
69EW3139	223293.68	853635.34	26.25	12.75	26.57	16.75	13.75	3	02/12/1999	OFF
69EW3140	223293.63	853625.01	26.25	12.75	26.53	16.75	13.75	3	02/12/1999	OFF
69EW3141	223293.3	853615.57	26.25	12.75	26.12	16.75	13.75	3	02/16/1999	OFF
69EW3142	223293.29	853605.24	26.25	12.75	26.71	16.75	13.75	3	02/16/1999	OFF
69EW3143	223293.09	853594.88	26.25	12.75	26.75	16.75	13.75	3	02/16/1999	OFF
69EW3144	223292.79	853585.93	26.25	12.75	27.05	16.75	13.75	3	02/16/1999	OFF
69EW3145	223291.92	853574.81	26.25	12.75	27.27	16.75	13.75	3	02/16/1999	OFF
69EW3146	223292.13	853563.85	26.25	12.75	27.49	16.75	13.75	3	02/16/1999	OFF
69EW3147	223282.85	853595.58	26.25	12.75	26.91	16.75	13.75	3	02/16/1999	OFF
69EW3148	223282.87	853605.83	26.25	12.75	26.84	16.75	13.75	3	02/16/1999	OFF
69EW3149	223283.26	853615.71	26.25	12.75	26.73	16.75	13.75	3	02/16/1999	OFF
69EW3150	223283.39	853625.47	26.25	12.75	26.72	16.75	13.75	3	02/16/1999	OFF

**Table 2-1**  
**FS-28 Shallow Well-Point System Construction Details**

Location	Northing	Easting	Surface Elev. (ft msl)	Total Depth (ft bgs)	TOC Elev. (ft msl)	Elev. Screen Top (ft msl)	Elev. Screen Bottom (ft msl)	Screen Length (feet)	Completion Date	Comment
69EW3176	223224.55	853656.32	26.25	12.75	26.6	16.75	13.75	3	02/17/1999	ON
69EW3177	223224.46	853646.31	26.25	12.75	26.56	16.75	13.75	3	02/17/1999	ON
69EW3178	223224.45	853636.31	26.25	12.75	26.73	16.75	13.75	3	02/17/1999	ON
69EW3179	223224.49	853626.44	26.25	12.75	26.84	16.75	13.75	3	02/17/1999	ON
69EW3180	223224.23	853616.7	26.25	12.75	26.92	16.75	13.75	3	02/17/1999	ON
69EW3181	223214.25	853616.39	26.25	12.75	26.83	16.75	13.75	3	02/17/1999	ON
69EW3182	223214.4	853625.95	26.25	12.75	26.81	16.75	13.75	3	02/17/1999	ON
69EW3183	223214.59	853636.43	26.25	12.75	26.55	16.75	13.75	3	02/17/1999	ON
69EW3184	223214.55	853646.16	26.25	12.75	26.61	16.75	13.75	3	02/17/1999	ON
69EW3185	223214.42	853656.29	26.25	12.75	26.57	16.75	13.75	3	02/17/1999	ON
69EW3186	223204.7	853656.18	26.25	12.75	26.69	16.75	13.75	3	02/17/1999	ON
69EW3187	223204.41	853646.62	26.25	12.75	26.64	16.75	13.75	3	02/17/1999	ON
69EW3188	223204.4	853636.22	26.25	12.75	26.59	16.75	13.75	3	02/17/1999	ON
69EW3189	223204.43	853626.51	26.25	12.75	27.02	16.75	13.75	3	02/17/1999	ON
69EW3190	223204.31	853616.44	26.25	12.75	26.91	16.75	13.75	3	02/17/1999	ON
69EW3191	223194.51	853616.28	26.25	12.75	26.83	16.75	13.75	3	02/17/1999	ON
69EW3192	223194.34	853626.08	26.25	12.75	26.65	16.75	13.75	3	02/17/1999	ON
69EW3193	223194.49	853636.54	26.25	12.75	26.38	16.75	13.75	3	02/17/1999	ON
69EW3194	223194.43	853646.49	26.25	12.75	26.4	16.75	13.75	3	02/17/1999	ON
69EW3195	223194.47	853656.39	26.25	12.75	26.54	16.75	13.75	3	02/17/1999	ON
69EW3196	223184.78	853656.28	26.25	12.75	26.47	16.75	13.75	3	02/17/1999	ON
69EW3197	223184.52	853646.4	26.25	12.75	26.46	16.75	13.75	3	02/17/1999	ON
69EW3198	223184.67	853636.2	26.25	12.75	26.4	16.75	13.75	3	02/17/1999	ON
69EW3199	223184.5	853626.38	26.25	12.75	26.56	16.75	13.75	3	02/17/1999	ON
69EW3200	223184.52	853616.7	26.25	12.75	26.77	16.75	13.75	3	02/17/1999	ON

**Table 2-1**  
**FS-28 Shallow Well-Point System Construction Details**

<b>Location</b>	<b>Northing</b>	<b>Easting</b>	<b>Surface Elev. (ft msl)</b>	<b>Total Depth (ft bgs)</b>	<b>TOC Elev. (ft msl)</b>	<b>Elev. Screen Top (ft msl)</b>	<b>Elev. Screen Bottom (ft msl)</b>	<b>Screen Length (feet)</b>	<b>Completion Date</b>	<b>Comment</b>
69EW3201	223175.96	853626.23	26.25	12.75	26.59	16.75	13.75	3	02/17/1999	ON
69EW3202	223174.55	853636.56	26.25	12.75	26.63	16.75	13.75	3	02/17/1999	ON
69EW3203	223174.64	853646.58	26.25	12.75	26.48	16.75	13.75	3	02/17/1999	ON
69EW3204	223174.72	853656.41	26.25	12.75	26.46	16.75	13.75	3	02/17/1999	ON

Notes:

Elev. = elevation

ft bgs = feet below ground surface

ft msl = feet mean sea level

TOC = top of casing

**Table 3-1**  
**FS-28 Groundwater Level Monitoring Events**  
**January through December 1999**

Location	Jan-99	Feb-99	Mar-99	Apr-99	May-99	Jun-99	Jul-99	Aug-99	Sep-99	Oct-99	Nov-99	Dec-99
69MW1284A	x	x	x	x	x	x	x	x	x	x	x	x
69PZ1284A	x	x	x	x	x	x	x	x	x	x	x	x
69MW1284B	x	x	x	x	x	x	x	x	x	x	x	x
69PZ1284B	x	x	x	x	x	x	x	x	x	x	x	x
69MW1285A	NA	NA	NA	NA	x	x	x	x	x	x	x	x
69MW1285B	NA	NA	NA	NA	x	x	x	x	x	x	x	x
69PZ1285B	NA	NA	NA	NA	x	x	x	x	x	x	x	x
69MW1288	NA	NA	NA	NA	x	x	x	x	x	x	x	x
69MW1290A	x	x	x	x	x	x	x	x	x	x	x	x
69MW1290B	x	x	x	x	x	x	x	x	x	x	x	x
69MW1291A	NA	NA	NA	NA	x	x	x	x	x	x	x	x
69PZ1291A	NA	NA	NA	NA	x	x	x	x	x	x	x	x
69MW1291B	NA	NA	NA	NA	x	x	x	x	x	x	x	x
69MW1292	x	x	x	x	x	x	x	x	x	x	x	x
69PZ1292A	x	x	x	x	x	x	x	x	x	x	x	x
69PZ1292B	x	x	x	x	x	x	x	x	x	x	x	x
69MW1293A	x	x	x	x	x	x	x	x	x	x	x	x
69PZ1293A	x	x	x	x	x	x	x	x	x	x	x	x
69MW1293B	x	x	x	x	x	x	x	x	x	x	x	x
69PZ1293B	x	x	x	x	x	x	x	x	x	x	x	x
69MW1294	NA	NA	NA	NA	x	x	x	x	x	x	x	x
69MW1296A	NA	NA	NA	NA	x	x	x	x	x	x	x	x
69MW1303A	x	x	x	x	x	x	x	x	x	x	x	x
69PZ1303A	x	x	x	x	x	x	x	x	x	x	x	x
69MW1303B	x	x	x	x	x	x	x	x	x	x	x	x
69PZ1303B	x	x	x	x	x	x	x	x	x	x	x	x
69PZ1303C	x	x	x	x	x	x	x	x	x	x	x	x
69MW1304	x	x	x	x	x	x	x	x	x	x	x	x
69PZ1304A	x	x	x	x	x	x	x	x	x	x	x	x
69PZ1304B	x	x	x	x	x	x	x	x	x	x	x	x
69MW1310	x	x	x	x	x	x	x	x	x	x	x	x
69PZ1310A	x	x	x	x	x	x	x	x	x	x	x	x
69PZ1310B	x	x	x	x	x	x	x	x	x	x	x	x
69PZ111	x	x	x	x	x	x	x	x	x	x	x	x
69PZ112	x	x	x	x	x	x	x	x	x	x	x	x
69PZ113	x	x	x	x	x	x	x	x	x	x	x	x
69PZ114	NA	NA	x	x	x	NA	x	x	x	x	x	x
69PZ115	x	x	x	x	x	NA	NA	NA	NA	NA	x	x
69PZ116	x	x	x	x	x	NA	x	x	x	x	x	x

**Notes:**

NA = not available, no measurement collected

Measurements not available at 69PZ0115 and 69PZ0116 (June data) due to an obstruction in the piezometers.

No measurement taken at 69PZ0114 (June) due to a scheduling error.

Measurements not available at 69PZ0115 (Sept. & Oct.) due to an obstruction in the piezometer.

**Table 3-2**  
**FS-28 Groundwater Chemical and Physicochemical Sampling Events**  
**January through December 1999**

Analytical Parameters	EDB												Physicochemical Parameters (Nutrients, TN, TP, TOC, DOC, TSS, Alkalinity)												Field Parameters (Temp.,DO, pH, Sp. Cond., ORP, Turbidity)																	
Wells and Piezometers	Jan 99	Feb 99	Mar 99	Apr 99	May 99	Jun 99	Jul 99	Aug 99	Sep 99	Oct 99	Nov 99	Dec 99	Jan 99	Feb 99	Mar 99	Apr 99	May 99	Jun 99	Jul 99	Aug 99	Sep 99	Oct 99	Nov 99	Dec 99	Jan 99	Feb 99	Mar 99	Apr 99	May 99	Jun 99	Jul 99	Aug 99	Sep 99	Oct 99	Nov 99	Dec 99						
69IG0001									x																																	
69IG0002				NS <sup>1</sup>	NS <sup>1</sup>	NS <sup>1</sup>	NS <sup>1</sup>	NS <sup>1</sup>	NS <sup>1</sup>	NS <sup>1</sup>																			NS <sup>1</sup>	NS <sup>1</sup>	NS <sup>1</sup>	NS <sup>1</sup>	NS <sup>1</sup>	NS <sup>1</sup>	NS <sup>1</sup>	NS <sup>1</sup>						
69IG0003				NS	NS	x <sup>1</sup>	x <sup>1</sup>	x <sup>1</sup>	x <sup>1</sup>	NS																		NS	NS	x	x	x	x	NS								
69IG0004				NS	NS	x <sup>1</sup>	x <sup>1</sup>	x <sup>1</sup>	x <sup>1</sup>	NS																		NS	NS	x	NS	x	NS	NS								
69IG0005						x <sup>1</sup>													x	x										x	x											
69IG0006						x <sup>2</sup>													x	x										x	x											
69IG0007						x													x	x										x	x											
69IG0008						x																									x	x										
69IG0009		x <sup>3</sup>																								x																
69IG00010				x <sup>2,4</sup>																								x														
69IG00011						x																								x												
69IG00012				NS	NS	x <sup>1</sup>	x <sup>1</sup>	x <sup>1</sup>	x <sup>1</sup>	NS																		NS	NS	x	NS	x	x	NS								
69IG00013						x																								x												
69MW1279A	x	x	x	x	x	x	x	x	x	x	x	x													x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
69MW1279B	x	x	x	x	x	x	x	x	x	x	x	x													x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
69MW1279C	x	x	x	x	x	x	x	x	x	x	x	x													x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
69MW1284A*	NS				x		x		x																NS				x		x		x									
69MW1284B*	NS				x		x		x																NS				x		x		x									
69MW1285A	NS				x		x		x																NS				x		x		x									
69MW1285B	NS				x		x		x																NS				x		x		x									
69MW1286	NS				x		x		x																NS				x		x		x									
69MW1291A	NS				x		x		x																NS				x		x		x									
69MW1291B	NS				x		x		x																NS				x		x		x									
69MW1295	NS				NS		NS		NS																NS				NS		NS		NS									
69MW1300A	NS				x		x		x																NS				x		x		x									
69MW1300B	NS				x		x		x																NS				x		x		x									
69MW1302	NS				x		x		x																NS				x		x		x									
69MW1303A*	NS				x		x		x																NS				x		x		x									
69MW1303B*	NS				x		x		x																NS				x		x		x									
69MW1304*	NS				x		x		x				NS	x	x	x	x	x	x	x	x	x	x	NS	NS	x	x	x	x	x	x	x	x	x	x	x	x	x	NS	NS		
69MW1306A	NS				x		x		x																NS				x		x											
69MW1306B	NS				x		x		x																NS				x		x											
69MW1308	NS				x		x		x																NS				x		x											
69MW1309	NS				x		x		x																NS				x		x											
69MW1310*													NS	x	x	x	x	x	x	x	x	x	NS	NS	NS	x	x	x	x	x	x	x	x	x	x	x	x	x	NS	NS		
69MW1501	x	x	x	x	x	x	x	x	x	x	x	x													x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
69PWS40960	x	x	x			x	x	x	x	x	x	x																														

x - sample collected  
x<sup>1</sup> - sample frequency biweekly  
x<sup>2</sup> - analyzed for VOCs (CLP OLC02.1)  
x<sup>3</sup> - analyzed for VOCs (modified SW8 260/5030)  
x<sup>4</sup> - analyzed for metals (ILM04.0)  
\* - ecological sampling location

NS - not sampled  
NS<sup>1</sup> - irrigation well not used during 1999  
EDB - ethylene dibromide  
TN - total nitrogen

TP - total phosphorus  
TOC - total organic carbon  
DOC - dissolved organic carbon  
Temp. - temperature

DO - dissolved oxygen  
Sp. Cond. - specific conductivity  
ORP - oxidation-reduction potential  
TSS - total suspended solids

**Table 3-3**  
**Coonamessett River Discharge Tracking**  
**January through December 1999**

LOCATION ID	Jan-99	Feb-99	Mar-99	Apr-99	May-99	Jun-99	Jul-99	Aug-99	Sep-99	Oct-99	Nov-99	Dec-99	Jan-00	Feb-00
69SW0006	1/18/99	2/11/99	3/18/99	4/20/99	5/19/99	hr	lf	lf	lwl	lwl	lwl	lwl	lf	lf
69SW0010	*	*	*	*	*	*	*	*	9/21/99	10/18/99	11/18/99	12/20/99	1/24/00	2/23/00
69SW0046	hwl	2/10/99	3/18/99	4/19/99	5/18/99	lf*	lf	8/13/99	9/21/99	10/18/99	11/18/99	12/20/99	lf	lf
69SW0049	01/13/1999 & 01/18/1999	2/10/99	3/17/99	4/19/99	5/18/99	6/22/99	7/14/99	8/16/99	9/21/99	10/15/99	11/19/99	12/20/99	1/24/00	2/23/00
69SW0058	1/18/99	2/11/99	3/19/99	4/20/99	5/19/99	6/23/99	lf	lf	lwl	lwl	nw	nw	1/24/00	nw

lf = low flow

lf\* = low flow because the water diverted/ weir boards restricting flow

nw = no water

lwl = low water level

hr = herring running, clogging up river

hwl = high water level, over waders, unsafe to enter

\* = 69SW0010 not included in monthly monitoring until 9/21/99

Table 3-4  
FS-28 Surface Water Sampling Events  
January through December 1999

Analytical Parameters	Ethylene Dibromide												Physicochemical Parameters (Nutrients, TN, TP, TOC, Alkalinity, Chlorophyll a)											
	Jan 99	Feb 99	Mar 99	Apr 99	May 99	Jun 99	Jul 99	Aug 99	Sept 99	Oct 99	Nov 99	Dec 99	Jan 99	Feb 99	Mar 99	Apr 99	May 99	Jun 99	Jul 99	Aug 99	Sept 99	Oct 99	Nov 99	Dec 99
COONAMESSETT RIVER																								
69SW0003 <sup>2</sup>																								
69SW0006 <sup>1,2,3</sup>	X	X	X	X	X	X	X	X	X	X	X	X			X		X			X			X	
69SW0008 <sup>1</sup>	NS	NS	NS	X	X	X	X	X	X	X	X	X												
69SW0010 <sup>2</sup>																								
69SW0011 <sup>1</sup>	X	X	X	X	X	X	X	X	X	X	X	X												
69SW0014 <sup>3</sup>	X	X	X	X	X	X	X	X	X	X	X	X												
69SW0019 <sup>1,2</sup>				X	NS	X	X	X	X	X	X	X												
69SW0024 <sup>1,2</sup>	X	X	X	X	X <sup>2</sup>	X	X	X	X	X	X	X												
69SW0046 <sup>1,2,3</sup>	X	X	X	X	X	X	X	X	X	X	X	X												
69SW0047 <sup>1,2</sup>	X	X	X	X	X	X	X	X	NS	X	X	X												
69SW0048 <sup>1</sup>	X	X	X	X	X	X	X	X	X	X	X	X												
69SW0049 <sup>1,3</sup>	NS	X	X	X	X <sup>2</sup>	X	X	X	X	X	X	X												
69SW0051 <sup>1</sup>	X	X	X	X	X	X	X	X	X	X	X	X												
69SW0052 <sup>1</sup>	X	X	X	X	X	X	X	X	X	X	X	X												
69SW0058 <sup>2</sup>																								
69SW0060 <sup>1,4</sup>	X	X	X	X	X	X	X	X	X	X	X	X			X		X			X			X	
69SW0065 <sup>2</sup>																								
69SW2000 <sup>1</sup>	NS	NS	X	X	X	X	X	X	X	X	X	X												
69SW2001 <sup>1</sup>	X	X	X	X	X	X	X	X	X	X	X	X												
69SW2002 <sup>1</sup>	X	X	X	X	X	X	X	X	X	X	X	X												
69SW2003 <sup>1</sup>	X	X	X	X	X	X	X	X	X	X	X	X												
69SW2004 <sup>1</sup>	X	NS	X	X	X	X	X	X	X	X	X	X												
69SW2005 <sup>1</sup>	X	X	X	X	X	X	X	X	X	X	X	X												
69SW2006 <sup>1</sup>	X	X	X	X	X	X	X	X	X	X	X	X												
69SW2007 <sup>1</sup>	X	X	X	X	X	X	X	X	X	X	X	X												
69SW2008 <sup>1</sup>	X	X	X	X	X <sup>2</sup>	X	X	X	X	X	X	X												
69SW2009 <sup>1</sup>	X	X	X	X	X	X	X	X	X	X	X	X												
69SW2010 <sup>1</sup>	NS*	NS*	X	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*												
69SW2011 <sup>1</sup>	X	X	X	X	X	X	X	X	X	X	X	X												
69SW2012 <sup>1</sup>	X	X	X	X	X	NS	X	NS	X	X	X	X												
69SW2013 <sup>1</sup>	X	NS	X	X	X	X	X	X	X	X	X	X												
69SW2014 <sup>1</sup>	X	X	X	X	X	X	X	X	X	X	X	X												
69SW2018 <sup>1</sup>																								
69SW2019 <sup>1</sup>												X												X

Table 3-4  
FS-28 Surface Water Sampling Events  
January through December 1999

Analytical Parameters	Field Parameters (Temp., DO, pH, Sp. Cond., ORP, Turbidity)												Discharge Measurements											
	Jan 99	Feb 99	Mar 99	Apr 99	May 99	Jun 99	Jul 99	Aug 99	Sept 99	Oct 99	Nov 99	Dec 99	Jan 99	Feb 99	Mar 99	Apr 99	May 99	Jun 99	Jul 99	Aug 99	Sept 99	Oct 99	Nov 99	Dec 99
COONAMESSETT RIVER																								
69SW0003 <sup>2</sup>	NS	NS	X	X	X	X	X	X	X	NS*	NS*	NS*												
69SW0006 <sup>1,2,3</sup>	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
69SW0008 <sup>1</sup>	NS	NS	NS	X	X	X	X	X	X	X	X	X												
69SW0010 <sup>2</sup>	NS	X	X	X	X	X	X	X	X	X	X	X				NS	NS	NS	NS	X	X	X	X	X
69SW0011 <sup>1</sup>	X	X	X	X	X	X	X	X	X	X	X	X												
69SW0014 <sup>3</sup>	X	X	X	X	X	X	X	X	X	X	X	X												
69SW0019 <sup>1,2</sup>	NS	NS	X	X	X	X	X	X	X	X	X	X												
69SW0024 <sup>1,2</sup>	X	X	X	X	X	X	X	X	X	X	X	X												
69SW0046 <sup>1,2,3</sup>	X	X	X	X	X	X	X	X	X	X	X	X												
69SW0047 <sup>1,2</sup>	X	X	X	X	X	X	X	X	X	X	X	X												
69SW0048 <sup>1</sup>	X	X	X	X	X	X	X	X	X	X	X	X												
69SW0049 <sup>1,3</sup>	NS	X	X	X	X	X	X	X	X	X	X	X												
69SW0051 <sup>1</sup>	X	X	X	X	X	X	X	X	X	X	X	X												
69SW0052 <sup>1</sup>	X	X	X	X	X	X	X	X	X	X	X	X												
69SW0058 <sup>2</sup>	NS	X	X	X	X	X	X	X	X	NS*	X	NS*												
69SW0060 <sup>1,4</sup>	X	X	X	X	X	X	X	X	X	X	X	X												
69SW0065 <sup>2</sup>	NS	X	X	X	X	X	X	X	X	X	X	X												
69SW2000 <sup>1</sup>	NS	NS	X	X	X	X	X	X	X	X	X	X												
69SW2001 <sup>1</sup>	X	X	X	X	X	X	X	X	X	X	X	X												
69SW2002 <sup>1</sup>	X	X	X	X	X	X	X	X	X	X	X	X												
69SW2003 <sup>1</sup>	X	X	X	X	X	X	X	X	X	X	X	X												
69SW2004 <sup>1</sup>	NS	X	X	X	X	X	X	X	X	X	X	X												
69SW2005 <sup>1</sup>	X	X	X	X	X	X	X	X	X	X	X	X												
69SW2006 <sup>1</sup>	X	X	X	X	X	X	X	X	X	X	X	X												
69SW2007 <sup>1</sup>	X	X	X	X	X	X	X	X	X	X	X	X												
69SW2008 <sup>1</sup>	X	X	X	X	X	X	X	X	X	X	X	X												
69SW2009 <sup>1</sup>	X	X	X	X	X	X	X	X	X	X	X	X												
69SW2010 <sup>1</sup>	NS*	NS*	X	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*												
69SW2011 <sup>1</sup>	X	X	X	X	X	X	X	X	X	X	X	X												
69SW2012 <sup>1</sup>	X	X	X	X	X	NS	X	NS	X	X	X	X												
69SW2013 <sup>1</sup>	X	NS	X	X	X	X	X	X	X	X	X	X												
69SW2014 <sup>1</sup>	X	X	X	X	X	X	X	X	X	X	X	X												
69SW2018 <sup>1</sup>												X												
69SW2019 <sup>1</sup>												X												

<sup>1</sup> - cranberry marketability study  
<sup>2</sup> - ecological impact monitoring  
<sup>3</sup> - risk management  
<sup>4</sup> - irrigation monitoring  
x - sample collected

x<sup>2</sup> - analyzed for VOCs (modified SW8260/5030)  
NS - not sampled  
NS\* - not sampled due to low flow  
Temp. - temperature  
DO - dissolved oxygen

Sp. Cond. - specific conductivity  
ORP - oxidation-reduction potential  
TP - total phosphorus  
TN - total nitrogen

**Table 3-5**  
**FS-28 Treatment Plant Monitoring**  
**January through December 1999**

Location ID	Anions	Alkalinity	Total Dissolved Solids	Total Suspended Solids	Biological Oxygen Demand	Chemical Oxygen Demand	Total Metals	Ethylene Dibromide	Total Organic Carbon	Dissolved Organic Carbon	Diesel Range Organic
Deep well influent (69EW0001)								M			
Shallow well point influent (69PLT01023)								M			
Combined influent (69PLT01001)	Q	Q	Q	Q	Q	Q	Q				N
Post-Lead GAC (69PLT01002 or 69PLT01003)								M			N
Effluent (69PLT01010)	Q	Q	Q	Q	Q	Q	Q	M	M	M	

GAC = granular activated carbon unit

Q - required quarterly by the Final Engineering Evaluation, Cost Analysis, and Execution Plan for Coonamessett River FS-28 Bog Separation Project (AFCEE 1998)

M - required monthly by the Final Engineering Evaluation, Cost Analysis, and Execution Plan for Coonamessett River FS-28 Bog Separation Project (AFCEE 1998)

N - required by the NPDES Permit Exclusion Letter

The footnotes reference the most current modifications of the above-mentioned documents.

**Table 4-1  
Coonamessett River Discharge Measurements for 1999**

Location ID		Jan-99	Feb-99	Mar-99	Apr-99	May-99	Jun-99	Jul-99	Aug-99	Sep-99	Oct-99	Nov-99	Dec-99
69SW0006	Area (ft <sup>2</sup> ):	6.13	5.16	2.65	3.15	2.89	NA	NA	NA	NA	NA	NA	NA
	Velocity (fps):	0.53	0.24	0.50	0.54	0.39	NA	NA	NA	NA	NA	NA	NA
	Discharge (cfs):	3.25	1.24	1.33	1.71	1.13	NA	NA	NA	NA	NA	NA	NA
69SW0010	Area (ft <sup>2</sup> ):	NA	NA	NA	NA	NA	NA	NA	NA	5.25	8.11	5.36	5.59
	Velocity (fps):	NA	NA	NA	NA	NA	NA	NA	NA	0.33	0.36	0.23	0.32
	Discharge (cfs):	NA	NA	NA	NA	NA	NA	NA	NA	1.71	2.90	1.29	1.79
69SW0046	Area (ft <sup>2</sup> ):	NA	11.43	2.23	8.35	2.30	NA	NA	1.37	1.48	2.25	1.32	1.31
	Velocity (fps):	NA	0.35	1.06	0.49	1.12	NA	NA	0.83	0.80	1.17	0.81	0.77
	Discharge (cfs):	NA	4.00	2.36	4.12	2.58	NA	NA	1.13	1.19	2.64	1.07	1.01
69SW0049	Area (ft <sup>2</sup> ):	6.13	8.13	9.18	10.28	9.98	7.79	6.31	9.29	8.13	9.22	9.37	7.88
	Velocity (fps):	0.53	0.72	0.98	0.80	0.81	0.39	0.36	0.49	0.47	0.44	0.40	0.51
	Discharge (cfs):	3.25	5.86	9.05	8.25	8.07	2.95	2.26	4.60	3.88	4.06	3.82	4.02
69SW0058	Area (ft <sup>2</sup> ):	3.02	2.91	3.11	2.69	2.46	2.27	NA	NA	NA	NA	NA	NA
	Velocity (fps):	0.41	0.44	0.36	0.71	0.48	0.32	NA	NA	NA	NA	NA	NA
	Discharge (cfs):	1.24	1.28	1.11	1.33	1.17	0.72	NA	NA	NA	NA	NA	NA

cfs = cubic feet per second

fps = feet per second

ft<sup>2</sup> = square feet

NA = not available

**Table 4-2**  
**Average Coonamessett River Discharge Measurements (cfs)**

Location	1997	1998	1999
69SW0049	9.6	6.7	5.2
69SW0046	6.4	7.1	2.4
69SW0010	2.1	2.3	1.8
69SW0006	2.5	3.7	1.3
69SW0058	2.7	2.8	1.2

cfs = cubic feet per second

**Table 4-3a**  
**FS-28 Groundwater Elevations from 1999 Monthly Monitoring**

Location ID	Mid-Screen Elevation msl	Vertical Gradient Screen Designator	Groundwater Elevations in ft msl											
			1/15/99	2/10/99	3/19/99	4/15/99	5/14/99	6/21/99	7/15/99	8/16/99	9/17/99	10/12/99	11/17/99	12/13/99
69MW1284A	-180		26.34	26.46	26.18	27.89	26.49	26.23	26.43	25.66	26.98	25.57	25.66	25.62
69PZ1284A	20.5	T	25.65	27.75	27.46	27.77	27.32	27.07	27.28	26.61	26.94	26.51	26.51	26.45
69MW1284B	-215.9	B	27.03	27.16	26.89	27.93	26.98	26.72	26.92	26.21	26.99	26.10	26.14	26.10
69PZ1284B	-64.5	M	25.40	28.50	27.24	27.86	27.20	26.94	27.14	26.44	26.97	26.36	26.35	26.32
69MW1285A	-34.4	M	NA	NA	NA	NA	25.25	25.31	26.33	24.97	24.97	24.88	24.84	24.79
69MW1285B	-154.3	B	NA	NA	NA	NA	25.74	25.70	26.43	25.32	25.35	25.21	25.20	25.15
69PZ1285B	-2.5	T	NA	NA	NA	NA	25.28	25.38	25.54	25.03	25.27	25.19	25.23	25.10
69MW1288	-142.5		NA	NA	NA	NA	24.01	24.96	25.60	24.61	24.52	24.51	24.48	24.40
69MW1290A	-178.1	T	26.88	26.98	26.81	26.86	26.48	26.23	26.47	25.85	25.86	25.71	25.67	25.83
69MW1290B	-232.1	B	27.06	27.12	27.04	27.08	26.68	26.43	26.67	26.03	26.16	25.88	25.86	25.81
69MW1291A	-83.5	M	NA	NA	NA	NA	25.01	25.09	26.08	24.71	24.67	24.60	24.56	24.51
69PZ1291A	15.5	T	NA	NA	NA	NA	24.71	24.84	26.07	24.47	24.40	24.35	24.26	24.23
69MW1291B	-128.4	B	NA	NA	NA	NA	25.30	25.26	26.04	24.89	24.86	24.78	24.76	24.71
69MW1292	-109.6	B	28.30	28.47	28.41	28.72	28.26	27.91	27.85	27.44	27.52	27.27	27.24	27.20
69PZ1292A	32.5	T	28.24	28.40	28.33	28.62	28.16	27.86	27.77	27.36	27.40	27.20	27.16	27.26
69PZ1292B	-17.5	M	28.29	28.42	28.37	28.67	28.10	27.84	27.78	27.39	27.46	27.24	27.18	27.12
69MW1293A	-147.99		28.49	28.63	28.45	28.64	28.35	28.06	28.10	27.56	27.70	27.47	27.44	27.41
69PZ1293A	23.5	T	28.35	28.50	28.26	28.47	28.15	27.86	27.94	27.53	27.46	27.33	27.29	27.25
69MW1293B	-218	B	28.53	28.64	28.49	28.67	28.28	28.09	28.15	27.62	27.73	27.61	27.47	27.43
69PZ1293B	-66.5	M	28.51	28.61	28.45	28.64	28.46	28.06	28.10	27.55	27.68	27.46	27.44	27.40
69MW1294	-18.3		NA	NA	NA	NA	24.69	24.84	26.04	24.43	24.40	24.35	24.28	24.23
69MW1296A	-143.65		NA	NA	NA	NA	25.28	25.21	25.86	24.85	24.78	24.75	24.71	24.67
69MW1303A	-174.3		26.97	27.03	27.34	27.41	26.68	26.48	26.85	26.08	26.58	25.92	25.96	25.94
69PZ1303A	17.5	T	27.15	27.45	27.22	27.24	26.84	26.64	27.04	26.27	26.53	26.16	26.14	26.10
69MW1303B	-214.95	B	26.87	27.04	27.25	27.43	26.70	26.53	26.86	26.06	26.54	25.92	25.97	25.91
69PZ1303B	-42.5	M	27.34	27.37	27.29	27.35	26.86	26.67	27.05	26.27	26.56	26.13	26.15	26.14
69PZ1303C	-112.5		27.44	27.35	27.51	27.54	26.96	26.81	27.04	26.20	26.18	26.09	26.15	26.06
69MW1304	-181	B	27.79	27.89	28.75	28.27	27.72	27.41	27.50	26.89	27.27	26.78	26.14	26.93
69PZ1304A	27.5	T	27.91	28.00	28.84	28.20	27.73	27.43	28.50	26.90	27.14	26.79	26.78	26.54
69PZ1304B	-57.5	M	27.98	28.10	28.89	28.32	27.85	27.58	27.62	26.99	27.28	26.88	26.87	26.84
69MW1310	-202.2	B	29.56	29.72	29.80	30.00	29.71	29.33	29.21	28.75	28.79	28.57	28.59	28.57
69PZ1310A	-84.7	M	29.71	29.87	29.95	30.14	29.87	29.49	29.33	28.87	28.90	28.71	28.70	28.64
69PZ1310B	15.3	T	29.65	29.81	29.91	30.08	29.78	29.41	29.25	28.83	28.80	28.65	28.70	28.61
69PZ111	21.85		27.60	27.59	27.39	27.70	26.28	27.01	27.21	26.55	26.87	26.36	26.44	26.37
69PZ112	19.39		27.88	27.94	27.68	27.93	27.56	27.32	26.49	26.85	27.50	26.64	23.73	29.24
69PZ113	16.85		27.49	27.55	27.12	27.36	26.96	26.77	27.08	26.37	26.62	26.04	26.21	26.17
69PZ114	22.88		NA	NA	29.48	29.56	29.37	NA	29.10	29.38	29.52	29.54	29.57	29.24
69PZ115	21.04		26.53	26.53	25.99	27.14	25.76	NA	NA	NA	NA	NA	26.24	27.01
69PZ116	18.11		25.30	25.09	24.41	24.26	24.15	NA	24.56	23.81	24.57	23.77	23.84	23.76
69SG0003	staff gauge		29.51	29.48	29.49	29.59	29.40	29.29	29.12	28.99	28.69	NA	NA	NA
69SG0014	staff gauge		29.36	29.48	26.70	26.69	26.68	26.96	28.74	26.65	26.68	26.68	26.68	28.45
69SW0057	staff gauge		35.43	35.49	35.79	35.67	35.49	35.94	34.85	34.84	34.84	34.84	34.88	34.94

NA = no measurement

T = top screen in well cluster

M = middle screen in well cluster

B = bottom screen in well cluster

MW = monitoring well

PZ = piezometer

Measurements not available at 69PZ0115 and 69PZ0116 (June data) due to an obstruction in the piezometers.

No measurement taken at 69PZ0114 (June) due to a scheduling error.

Measurements not available at 69PZ0115 (Sept. & Oct.) due to an obstruction in the piezometer.

**Table 4-3b**  
**Summary of FS-28 1999 Groundwater Elevation and Hydraulic Gradient Trends**

Location	1999 Groundwater Elevation Summary		1999 Vertical Gradient Summary					
	Trend	Temporary Increases	Between Top and Middle Screens		Between Top and Bottom Screens		Between Middle and Bottom Screens	
			Flow Direction	Trend	Flow Direction	Trend	Flow Direction	Trend
<b>Cluster 1310</b> 69PZ1310B 69PZ1310A 69MW1310	Decrease 1-1.5 ft Decrease 1-1.5 ft Decrease 1-1.5 ft	Apr, Sep Apr, Sep Apr, Sep	Up	Down	Down	Up	Down	Up
<b>Cluster 1292</b> 69PZ1292A 69PZ1292B 69MW1292	Decrease 1-1.5 ft Decrease 1-1.5 ft Decrease 1-1.5 ft	Apr, Jul, Sep Apr, Jul, Sep Apr, Jul, Sep	Up	Down	Up	Down	Up	Up
<b>Cluster 1293</b> 69PZ1293A 69MW1293B 69PZ1293B 69MW1293A	Decrease 1-1.5 ft Decrease 1-1.5 ft Decrease 1-1.5 ft Decrease 1-1.5 ft	Feb, Apr, Jul, Sep Feb, Apr, Jul, Sep Feb, Apr, Jul, Sep Feb, Apr, Jul, Sep	Up	Down	Up	Up	Up	Up
<b>Cluster 1304</b> 69PZ1304A 69PZ1304B 69MW1304	Decrease 1.5 ft Decrease 1.5 ft Decrease 1.5 ft	Mar, Jul, Sep Mar, Jul, Sep Mar, Jul, Sep	Up	Up	Down	Up	Down	Down
<b>Cluster 1284</b> 69PZ1284A 69PZ1284B 69MW1284A 69MW1284B	Decrease 1-1.5 ft Decrease 1-1.5 ft Decrease 1-1.5 ft Decrease 1-1.5 ft	Feb, Apr, Jul, Sep Feb, Apr, Jul, Sep Apr, Jul, Sep Apr, Jul, Sep	Down	Down	Down	Down	Down	Down
<b>Cluster 1303</b> 69PZ1303A 69PZ1303B 69PZ1303C 69MW1303A 69MW1303B	Decrease 1-1.5 ft Decrease 1-1.5 ft Decrease 1-1.5 ft Decrease 1-1.5 ft Decrease 1-1.5 ft	Apr, Jul, Sep Apr, Jul, Sep Apr, Jul, Sep Apr, Jul, Sep Apr, Jul, Sep	Up	Down	Down	Level	Down	Up
<b>Cluster 1290</b> 69MW1290A 69MW1290B	Decrease 1-1.5 ft Decrease 1-1.5 ft	Jul, Sep Jul, Sep	NA	NA	Up	Down	NA	NA
<b>Cluster 1285</b> 69PZ1285B 69MW1285A 69MW1285B	Decrease 0.5 ft Decrease 0.5 ft Decrease 0.5 ft	Jul Jul Jul	Down	Down	Up	Down	Up	Level
<b>Cluster 1291</b> 69PZ1291A 69MW1291A 69MW1291B	Decrease 0.5 ft Decrease 0.5 ft Decrease 0.5 ft	Jul Jul Jul	Up	Up	Up	Up	Up	Up
69MW1296A	Decrease 0.5 ft	Jul	NA	NA	NA	NA	NA	NA
69MW1294	Decrease 0.5 ft	Jul	NA	NA	NA	NA	NA	NA
69MW1288	Decrease 0.5 ft	Jul	NA	NA	NA	NA	NA	NA
69PZ0111	Decrease 1 ft	Apr, Sep	NA	NA	NA	NA	NA	NA
69PZ0112	Decrease 1 ft	Apr, Sep	NA	NA	NA	NA	NA	NA
69PZ0113	Decrease 1-1.5 ft	Apr, Jul, Sep	NA	NA	NA	NA	NA	NA
69PZ0114	Level		NA	NA	NA	NA	NA	NA
69PZ0115	Level	Apr	NA	NA	NA	NA	NA	NA
69PZ0116	Decrease 1.5 ft	Jul, Sep	NA	NA	NA	NA	NA	NA

**Notes:**

NA is not available.

Monitoring well clusters, monitoring wells, and piezometers are listed from north to south.

Within monitoring well clusters, monitoring wells and piezometers are listed from shallow to deep screen elevations.

--- Denotes well clusters exhibiting downward gradients most likely due to pumping from deep groundwater extraction well 69EW0001

--- Denotes well clusters exhibiting upward gradients possibly due to pumping from the shallow groundwater extraction system

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**Table 4-4**  
**FS-28 1999 Groundwater Ethylene Dibromide (EDB) Results**

Location	Date	EDB (µg/L)	Detection Limit	Reporting Limit
69PWS40960	13-Jan-99	ND	0.0044	0.01
	10-Feb-99	ND	0.0044	0.01
	18-Mar-99	ND	0.0044	0.01
	14-Apr-99	ND	0.0044	0.01
	13-May-99	ND	0.0044	0.01
	17-Jun-99	ND	0.0044	0.01
	6-Aug-99	ND	0.0050	0.01
	6-Aug-99	ND	0.0050	0.01
	6-Aug-99	ND	0.0050	0.01
	6-Aug-99	ND	0.0044	0.01
	6-Aug-99	ND	0.0044	0.01
	6-Aug-99	ND	0.0044	0.01
	17-Aug-99	ND	0.0044	0.01
	15-Sep-99	ND	0.0044	0.01
	14-Oct-99	ND	0.0044	0.01
	12-Nov-99	ND	0.0019	0.01
	16-Dec-99	ND	0.0044	0.01
69MW1279A	13-Jan-99	ND	0.0044	0.01
	10-Feb-99	ND	0.0044	0.01
	18-Mar-99	ND	0.0044	0.01
	14-Apr-99	ND	0.0044	0.01
	13-May-99	ND	0.0044	0.01
	17-Jun-99	ND	0.0044	0.01
	13-Jul-99	ND	0.0044	0.01
	17-Aug-99	ND	0.0044	0.01
	15-Sep-99	ND	0.0044	0.01
	14-Oct-99	ND	0.0044	0.01
	12-Nov-99	ND	0.0019	0.01
	16-Dec-99	ND	0.0044	0.01
69MW1279B	13-Jan-99	ND	0.0044	0.01
	10-Feb-99	ND	0.0044	0.01
	18-Mar-99	ND	0.0044	0.01
	14-Apr-99	ND	0.0044	0.01
	13-May-99	ND	0.0044	0.01
	17-Jun-99	ND	0.0044	0.01
	13-Jul-99	ND	0.0044	0.01
	17-Aug-99	ND	0.0044	0.01
	15-Sep-99	ND	0.0044	0.01
	14-Oct-99	ND	0.0044	0.01
	12-Nov-99	ND	0.0019	0.01
	16-Dec-99	ND	0.0044	0.01

**Table 4-4**  
**FS-28 1999 Groundwater Ethylene Dibromide (EDB) Results**

Location	Date	EDB (µg/L)	Detection Limit	Reporting Limit
69MW1279C	13-Jan-99	0.0092J	0.0044	0.01
	10-Feb-99	0.0085J	0.0044	0.01
	18-Mar-99	ND	0.0044	0.01
	14-Apr-99	0.010	0.0044	0.01
	13-May-99	0.011	0.0044	0.01
	17-Jun-99	0.011	0.0044	0.01
	13-Jul-99	0.011	0.0044	0.01
	17-Aug-99	0.013	0.0044	0.01
	15-Sep-99	0.013	0.0044	0.01
	14-Oct-99	0.012	0.0044	0.01
	12-Nov-99	0.012	0.0019	0.01
	16-Dec-99	ND	0.0044	0.01
69MW1284A	12-May-99	7.75	0.2	0.4
	8-Jul-99	7.10	0.054	0.2
	24-Sep-99	5.85	0.2	0.4
69MW1284B	12-May-99	0.460	0.0250	0.05
	8-Jul-99	0.290	0.0027	0.01
	24-Sep-99	0.330	0.0100	0.02
69MW1285A	13-May-99	0.241	0.0100	0.02
	12-Jul-99	0.220	0.0027	0.01
	24-Sep-99	0.365	0.0100	0.02
69MW1285B	13-May-99	1.870	0.0500	0.10
	12-Jul-99	1.300	0.0270	0.10
	24-Sep-99	0.355	0.0100	0.02
69MW1286	10-May-99	ND	0.0050	0.01
	12-Jul-99	ND	0.0027	0.01
	24-Sep-99	ND	0.0050	0.01
69MW1291A	12-May-99	0.012	0.0050	0.01
	8-Jul-99	ND	0.0027	0.01
	24-Sep-99	ND	0.0050	0.01
69MW1291B	12-May-99	ND	0.0050	0.01
	8-Jul-99	ND	0.0027	0.01
	24-Sep-99	ND	0.0050	0.01
69MW1300A	10-May-99	ND	0.0050	0.01
	12-Jul-99	0.044	0.0027	0.01
	24-Sep-99	0.033	0.0050	0.01
69MW1300B	10-May-99	0.062	0.0050	0.01
	12-Jul-99	0.067	0.0027	0.01
	24-Sep-99	0.185	0.0050	0.01
69MW1302	10-May-99	0.073	0.0050	0.01
	12-Jul-99	0.100	0.0027	0.01
	24-Sep-99	0.022	0.0050	0.01
69MW1303A	12-May-99	2.000	0.1000	0.20
	13-Jul-99	2.400	0.0270	0.10
	24-Sep-99	3.450	0.1000	0.20
69MW1303B	12-May-99	0.033	0.0050	0.01
	13-Jul-99	ND	0.0027	0.01
	24-Sep-99	0.019	0.0050	0.01
69MW1304	13-May-99	5.940	0.2000	0.40
	12-Jul-99	6.400	0.1400	0.50
	24-Sep-99	5.310	0.2000	0.40

**Table 4-4**  
**FS-28 1999 Groundwater Ethylene Dibromide (EDB) Results**

Location	Date	EDB (µg/L)	Detection Limit	Reporting Limit
69MW1306A	10-May-99	ND	0.0050	0.01
	13-Jul-99	ND	0.0027	0.01
	23-Sep-99	ND	0.0050	0.01
69MW1306B	10-May-99	ND	0.0050	0.01
	13-Jul-99	ND	0.0027	0.01
	23-Sep-99	ND	0.0050	0.01
69MW1308	12-May-99	ND	0.0050	0.01
	14-Jul-99	ND	0.0044	0.01
	24-Sep-99	ND	0.0050	0.01
69MW1309	13-May-99	ND	0.0050	0.01
	12-Jul-99	ND	0.0027	0.01
	24-Sep-99	ND	0.0050	0.01
69MW1501	13-Jan-99	ND	0.0044	0.01
	10-Feb-99	ND	0.0044	0.01
	18-Mar-99	ND	0.0044	0.01
	14-Apr-99	ND	0.0044	0.01
	13-May-99	ND	0.0044	0.01
	17-Jun-99	ND	0.0044	0.01
	13-Jul-99	ND	0.0044	0.01
	17-Aug-99	ND	0.0044	0.01
	15-Sep-99	ND	0.0044	0.01
	14-Oct-99	ND	0.0044	0.01
	12-Nov-99	ND	0.0019	0.01
	16-Dec-99	ND	0.0044	0.01
69IG0003	17-Jun-99	ND	0.0027	0.01
	9-Jul-99	ND	0.0050	0.01
	28-Jul-99	ND	0.0050	0.01
	11-Aug-99	ND	0.0050	0.01
	25-Aug-99	ND	0.0050	0.01
	10-Sep-99	ND	0.0050	0.01
	22-Sep-99	ND	0.0050	0.01
69IG0004	16-Jun-99	ND	0.0027	0.01
	13-Jul-99	ND	0.0050	0.01
	28-Jul-99	ND	0.0050	0.01
	11-Aug-99	ND	0.0050	0.01
	25-Aug-99	ND	0.0050	0.01
	10-Sep-99	ND	0.0050	0.01
	22-Sep-99	ND	0.0050	0.01

**Table 4-4**  
**FS-28 1999 Groundwater Ethylene Dibromide (EDB) Results**

Location	Date	EDB (µg/L)	Detection Limit	Reporting Limit
69IG0005	16-Jun-99	ND	0.0027	0.01
69IG0006	16-Jun-99	ND	0.0027	0.01
69IG0007	16-Jun-99	ND	0.0027	0.01
69IG0008	16-Jun-99	ND	0.0027	0.01
69IG0009	11-Feb-99	ND	0.0050	0.01
69IG0010	1-Apr-99	ND	0.0047	0.01
69IG0011	16-Jun-99	ND	0.0027	0.01
69IG0012	16-Jun-99	ND	0.0027	0.01
	13-Jul-99	ND	0.0050	0.01
	28-Jul-99	ND	0.0050	0.01
	11-Aug-99	ND	0.0050	0.01
	25-Aug-99	ND	0.0050	0.01
	10-Sep-99	ND	0.0050	0.01
	22-Sep-99	ND	0.0050	0.01
69IG0013	17-Jun-99	ND	0.0027	0.01

Notes:

J = estimated value

ND = non detect

µg/L = micrograms per liter

**Table 4-5  
FS-28 1999 Groundwater Field Parameters**

Location	Midscreen Elevation (ft msl)	Date	Temperature (°C)	Dissolved Oxygen (mg/L)	pH (std)	Specific Conductivity (µS/cm)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
69MW1279A	-31.2	13-Jan-99	11.9	9.0	4.96	72	266	0.3
		10-Feb-99	12.1	9.2	4.96	71	274	0.6
		18-Mar-99	12.8	9.4	5.25	74	499	0.4
		14-Apr-99	13.0	9.6	4.95	70	417	0.1
		13-May-99	13.1	9.8	5.11	72	296	-0.3
		17-Jun-99	12.4	8.9	5.11	71	292	1.4
		13-Jul-99	12.7	8.8	5.25	74	294	0.4
		17-Aug-99	14.0	8.5	4.96	72	420	0.8
		15-Sep-99	14.3	8.7	4.90	70	370	0.1
		14-Oct-99	12.0	8.8	5.13	76	317	0.2
		12-Nov-99	11.9	8.4	5.09	73	374	0.3
		16-Dec-99	12.0	8.6	5.46	78	285	1.2
69MW1279B	-65.3	13-Jan-99	11.9	9.0	5.52	74	214	2.9
		10-Feb-99	12.3	9.6	5.48	76	234	0.4
		18-Mar-99	12.2	8.7	5.80	81	480	0.4
		14-Apr-99	12.1	9.4	5.49	78	404	1.0
		13-May-99	12.4	8.0	5.56	81	276	0.8
		17-Jun-99	12.5	8.2	5.57	80	244	0.2
		13-Jul-99	12.6	8.3	5.73	85	301	0.4
		17-Aug-99	13.9	7.4	5.54	86	400	2.1
		15-Sep-99	13.0	8.4	5.36	81	345	0.2
		14-Oct-99	12.1	8.0	5.57	86	308	2.5
		12-Nov-99	11.3	7.6	5.59	86	353	1.3
		16-Dec-99	12.0	7.3	5.92	89	272	2.1
69MW1279C	-105.5	13-Jan-99	11.6	6.1	5.91	62	204	2.8
		10-Feb-99	11.9	6.2	5.84	63	218	2.6
		18-Mar-99	12.2	5.9	6.32	67	452	2.5
		14-Apr-99	12.1	6.3	5.93	66	387	1.1
		13-May-99	12.2	5.8	5.98	68	261	1.5
		17-Jun-99	12.1	6.3	6.01	67	190	1.2
		13-Jul-99	12.1	6.0	6.17	71	262	1.1
		17-Aug-99	13.1	5.8	6.08	72	382	2.4
		15-Sep-99	13.0	6.2	5.74	71	339	2.8
		14-Oct-99	12.0	6.4	5.97	75	281	2.0
		12-Nov-99	11.8	8.3	6.08	72	305	2.7
		16-Dec-99	12.0	6.6	6.37	76	228	0.8
69MW1284A	-180.0	12-May-99	14.5	4.4	6.06	75	223	2.7
		8-Jul-99	13.7	4.2	6.16	73	227	0.8
		24-Sep-99	13.2	4.0	4.34	77	381	0.4
69MW1284B	-215.9	12-May-99	13.5	2.5	5.80	81	218	0.2
		8-Jul-99	14.1	1.5	6.16	82	110	0.4
		24-Sep-99	13.6	0.9	5.78	90	318	0.2
69MW1285A	-34.4	13-May-99	12.3	9.7	5.90	71	166	0.2
		12-Jul-99	13.0	8.4	5.99	75	344	0.7
		24-Sep-99	13.3	8.9	5.70	78	457	0.5

**Table 4-5**  
**FS-28 1999 Groundwater Field Parameters**

Location	Midscreen Elevation (ft msl)	Date	Temperature (°C)	Dissolved Oxygen (mg/L)	pH (std)	Specific Conductivity (µS/cm)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
69MW1285B	-154.3	13-May-99	12.5	1.1	6.01	81	140	0.4
		12-Jul-99	12.5	0.2	6.13	85	321	0.4
		24-Sep-99	13.5	0.3	5.95	100	429	0.3
69MW1286	-155.0	10-May-99	12.8	0.6	5.87	86	396	0.8
		12-Jul-99	13.7	2.4	3.45	83	549	3.6
		24-Sep-99	13.7	0.5	6.16	87	390	3.2
69MW1291A	-83.5	12-May-99	13.1	2.4	4.73	88	329	2.8
		8-Jul-99	14.9	1.1	5.29	87	132	0.7
		24-Sep-99	13.7	0.2	5.79	97	280	2.0
69MW1291B	-128.4	12-May-99	13.0	0.8	6.37	97	238	0.7
		8-Jul-99	14.1	0.6	6.44	95	80	0.4
		24-Sep-99	13.1	0.2	6.04	99	270	0.3
69MW1300A	-1.3	10-May-99	13.6	2.8	5.45	63	485	1.4
		12-Jul-99	15.6	4.7	5.43	63	267	0.4
		24-Sep-99	15.5	6.3	5.26	57	443	1.9
69MW1300B	-76.4	10-May-99	13.5	3.0	6.20	82	459	0.6
		12-Jul-99	14.8	1.6	4.35	81	499	1.0
		24-Sep-99	14.5	1.1	6.06	84	370	5.8
69MW1302	-75.8	10-May-99	13.3	0.4	6.20	101	399	0.7
		12-Jul-99	15.4	0.3	4.90	99	492	1.4
		24-Sep-99	14.4	0.3	6.28	100	388	2.6
69MW1303A	-174.3	12-May-99	13.0	3.4	6.02	75	106	1.2
		13-Jul-99	13.9	2.9	6.17	78	447	1.2
		24-Sep-99	14.5	4.1	6.28	81	342	2.1
69MW1303B	-215.0	12-May-99	12.7	2.6	6.05	72	39	3.7
		13-Jul-99	12.9	1.3	6.13	75	417	3.5
		24-Sep-99	14.1	1.9	6.29	81	294	4.4
69MW1304	-181.0	9-Feb-99	10.9	6.1	5.98	69	201	2.9
		23-Feb-99	10.7	5.4	5.96	68	190	2.9
		31-Mar-99	12.6	6.7	6.19	73	424	2.9
		28-Apr-99	12.7	5.4	6.15	70	167	1.5
		13-May-99	12.6	7.5	6.06	69	158	0.7
		26-May-99	13.6	5.6	4.53	71	376	3.6
		30-Jun-99	14.0	5.8	5.91	67	200	1.4
		12-Jul-99	13.3	5.7	6.13	69	311	2.1
		27-Jul-99	14.5	5.8	5.80	70	387	2.7
		25-Aug-99	14.2	5.6	5.92	86	342	1.6
		24-Sep-99	14.3	6.0	5.86	74	442	6.9
		29-Sep-99	13.7	5.3	6.22	70	378	3.4
		29-Oct-99	13.2	5.7	6.00	88	285	3.3
		30-Nov-99	11.2	5.7	5.85	69	471	3.8
69MW1306A	-81.8	6-Jan-00	11.6	5.7	6.31	70	211	0.9
		10-May-99	14.1	4.4	6.13	65	157	1.2
		13-Jul-99	13.2	3.6	5.86	71	460	0.8
69MW1306B	-181.8	23-Sep-99	13.5	4.6	5.60	66	438	0.7
		10-May-99	12.2	0.7	6.84	125	-84	0.6
		13-Jul-99	13.2	0.2	6.17	127	416	1.5
		23-Sep-99	12.6	0.3	6.28	125	352	0.3

**Table 4-5**  
**FS-28 1999 Groundwater Field Parameters**

Location	Midscreen Elevation (ft msl)	Date	Temperature (°C)	Dissolved Oxygen (mg/L)	pH (std)	Specific Conductivity (µS/cm)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
69MW1308	-90.9	12-May-99	13.0	0.8	6.31	86	15	1.9
		14-Jul-99	15.0	0.9	3.44	166	194	1.7
		24-Sep-99	14.7	1.5	6.40	92	287	3.2
69MW1309	-101.1	13-May-99	13.0	8.6	6.00	72	166	0.5
		12-Jul-99	14.0	7.1	6.11	75	289	0.0
		24-Sep-99	14.1	7.3	5.84	80	444	0.6
69MW1310	-202.2	9-Feb-99	11.4	9.1	6.24	74	199	2.0
		23-Feb-99	10.4	9.5	5.99	74	193	1.0
		31-Mar-99	12.2	9.1	6.10	77	436	0.9
		27-Apr-99	12.4	9.1	6.07	76	298	0.5
		26-May-99	12.7	8.6	5.98	76	266	0.8
		30-Jun-99	12.7	9.0	5.80	76	212	-0.2
		27-Jul-99	13.8	8.5	5.78	78	389	0.9
		25-Aug-99	13.7	9.1	5.86	98	354	0.2
		29-Sep-99	13.9	8.1	6.14	78	352	0.9
		29-Oct-99	12.5	8.0	5.94	96	308	1.2
		30-Nov-99	11.6	8.6	5.75	77	487	1.6
		4-Jan-00	12.6	8.4	6.27	77	212	1.5
69MW1501	-27.6	13-Jan-99	12.1	0.2	5.24	74	152	0.4
		10-Feb-99	13.4	0.7	5.29	72	154	0.3
		18-Mar-99	14.3	1.2	5.48	71	313	0.6
		14-Apr-99	13.9	2.9	5.37	70	388	0.3
		13-May-99	14.7	1.0	5.37	72	238	0.0
		17-Jun-99	14.1	0.8	5.25	74	149	-0.1
		13-Jul-99	13.9	0.4	5.34	84	208	-0.3
		17-Aug-99	17.2	0.6	5.22	92	381	0.4
		15-Sep-99	16.8	1.0	4.90	92	296	0.3
		14-Oct-99	13.9	1.2	5.26	100	258	-0.1
		12-Nov-99	13.9	0.8	5.34	96	186	0.5
		16-Dec-99	13.1	0.3	5.60	98	174	0.0
69IG0001	NA	9/22/99	13.9	0.12	5.48	85	153.3	3.3
69IG0003	NA	6/16/99	12.53	11.22	6.52	88	444.4	0.4
		7/9/99	12.56	11.22	6.52	88	444.4	0.4
		7/28/99	12.76	7.46	6.31	92	179.8	0
		8/11/99	13.58	7.58	6.39	105	202	1
		8/25/99	13.34	6.24	6.69	93	330.9	-0.6
		9/10/99	13.56	7.29	6.43	98	141.3	0.2
		9/22/99	13.28	6.63	6.42	101	118.8	-0.1

**Table 4-5**  
**FS-28 1999 Groundwater Field Parameters**

Location	Midscreen Elevation (ft msl)	Date	Temperature (°C)	Dissolved Oxygen (mg/L)	pH (std)	Specific Conductivity (µS/cm)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
69IG0004	-15.01	6/16/99	14.16	6.53	7.05	34	483.3	23.8
		8/25/99	15.37	8.85	7.42	4	271.9	1.7
69IG0005	-27.30	6/16/99	12.28	11.31	7	96	443.5	0.7
69IG0006	-27.50	6/16/99	12.28	11.31	7	96	443.5	0.7
69IG0007	-27.10	6/16/99	12.9	8.21	6.98	40	442.7	0.7
69IG0008	-27.10	6/16/99	12.9	8.21	6.98	40	442.7	0.7
69IG0009	-21.90	2/11/99	11.35	9.18	5.56	101	190.9	32.7
69IG0010	-22.40	4/1/99	10.66	10.8	8.42	110	14	0
69IG0011	-16.60	6/16/99	13.14	9.03	7.08	93	425.4	1.6
69IG0012	NA	6/16/99	14.02	9.58	7.19	1	452.1	0.8
		8/25/99	14.29	5.21	7.09	82	321.6	1
		9/22/99	12.96	9.7	7.24	86	129.3	0.6
69IG0013	-14.4	6/17/99	13.17	8.08	6.4	46	167.3	2.8

°C = degrees Celsius

µS/cm = microsiemens per centimeter

mg/L = milligrams per liter

mV = millivolts

NA = not available

ntu = nephelometric turbidity unit

std = standard unit

**Table 4-6**  
**FS-28 1999 Alkalinity and Nutrients Results in Groundwater**

Location ID	Midscreen Elevation (ft msl)	Date	Alkalinity, Total (AS CaCO <sub>3</sub> ) (mg/L)		Total Organic Carbon (mg/L)		Dissolved Organic Carbon (mg/L)		Nitrogen (µg/L)		Nitrogen, Ammonia (AS N) (µg/L)		Nitrogen, Nitrate (AS N) (µg/L)		Nitrogen, Nitrite (µg/L)		Phosphorus, Total (AS P) (µg/L)		Phosphorus, Total PO <sub>4</sub> (AS P) (µg/L)	
			Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
69MW1304	-181.0	02/09/99	18.3		0.133	U	0.93	J	133		ND	U	131		0.10	U	30.0		29.0	
		02/23/99	15.7		0.055	U	0.06	U	133		ND	U	121		0.60	U	34.8		30.2	
		03/31/99	16.3		0.339	U	1.60		137		ND	U	121		0.30	U	31.2		30.0	
		04/28/99	30.3		0.267	U	0.29	U	141		ND	U	124		0.60	U	30.4		ND	U
		05/26/99			0.161	U	1.24		130		ND	U	115		0.60	U	32.7		32.2	
		06/30/99	16.3		0.139	U	ND	U	125		ND	U	128		0.45	U	30.5		29.4	
		07/27/99	16.9		0.138	U	1.65		150		0.9	J	129		0.65	U	33.6		30.2	
		08/25/99	20.4		0.102	U	1.06		150		ND	U	136		0.25	U	37.5		32.1	
		09/29/99	20.0		0.179	U	1.04		123		ND	U	135		1.20	J	39.4		31.9	
		10/29/99	16.8		0.421	J	0.97	J	143		ND	U	168		0.80	J	37.0		36.6	
		11/30/99	17.9		0.331	J	0.64	J	157		ND	U	124		1.05	U	36.5		35.7	
01/06/00	18.8		0.320	U	0.50	U	139		ND	U	133		0.95	U	36.9		34.5			
63MW1304 Average			18.9		0.215		0.91		138		NA		130		0.63		34.2		32.0	
69MW1310	-202.2	02/09/99	39.8		0.343	U	1.12		293		ND	U	281		0.10	U	38.0		37.8	
		02/23/99	13.0		0.055	U	0.06	U	276		ND	U	269		0.35	U	40.3		37.6	
		03/31/99	13.4		0.161	U	1.69		277		ND	U	257		0.15	U	40.5		36.9	
		04/27/99	16.6		0.175	U	0.85	J	338		ND	U	299		0.10	U	38.5		36.5	J
		05/26/99	15.8		0.207	U	0.39	U	350		ND	U	295		0.35	U	39.5		38.3	
		06/30/99	16.3		0.125	U	0.40	U	329		ND	U	311		0.10	U	38.2		36.7	
		07/27/99	19.5		0.132	U	1.84		377		1.7	J	316		0.25	U	39.6		36.4	
		08/25/99	13.7		0.124	U	0.91	J	320		ND	U	308		0.25	U	44.0		38.2	
		09/29/99	16.3		0.226	U	0.40	U	235		ND	U	307		0.30	J	47.3		35.7	
		10/29/99	19.2		0.355	J	1.87		322		ND	U	355		0.20	J	45.2		40.4	
		11/30/99	7.5	U	1.380		0.42	J	327		ND	U	274		0.90	U	43.4		42.6	
01/04/00	18.3		0.055	U	0.06	U	295		ND	U	294		0.50	J	41.6		39.5			
63MW1310 Average			17.5		0.278		0.83		312		NA		297		0.30		41.3		38.1	

CaCO<sub>3</sub> - calcium carbonate  
ft msl - feet mean sea level  
J - estimated concentration  
mg/L - milligrams per liter  
ND - not detected

N - nitrogen  
P - phosphorus  
Q - data validation qualifier  
U - not detected  
µg/L - micrograms per liter

(intentionally blank)

**Table 4-7  
FS-28 1999 Surface Water Concentrations of Ethylene Dibromide (EDB)**

Location ID	Date	EDB (µg/L)	Detection Limit	Reporting Limit
69SW0006	28-Jan-99	ND	0.005	0.01
	22-Feb-99	ND	0.005	0.01
	23-Mar-99	ND	0.005	0.01
	14-Apr-99	ND	0.0027	0.01
	13-May-99	ND	0.005	0.01
	16-Jun-99	ND	0.005	0.01
	13-Jul-99	ND	0.005	0.01
	12-Aug-99	ND	0.005	0.01
	13-Sep-99	ND	0.005	0.01
	12-Oct-99	ND	0.005	0.01
	16-Nov-99	ND	0.005	0.01
	15-Dec-99	ND	0.005	0.01
	14-Apr-99	ND	0.0027	0.01
	13-May-99	ND	0.005	0.01
69SW0008	28-Jan-99	ND	0.005	0.01
	22-Feb-99	ND	0.005	0.01
	23-Mar-99	ND	0.005	0.01
	14-Apr-99	ND	0.0027	0.01
	13-May-99	ND	0.005	0.01
	16-Jun-99	ND	0.005	0.01
	13-Jul-99	ND	0.005	0.01
	12-Aug-99	ND	0.005	0.01
	13-Sep-99	ND	0.005	0.01
	12-Oct-99	ND	0.005	0.01
	16-Nov-99	ND	0.005	0.01
	15-Dec-99	ND	0.005	0.01
	14-Apr-99	ND	0.0027	0.01
	13-May-99	ND	0.005	0.01
69SW0011	28-Jan-99	ND	0.005	0.01
	22-Feb-99	ND	0.005	0.01
	23-Mar-99	ND	0.005	0.01
	14-Apr-99	ND	0.0027	0.01
	13-May-99	ND	0.005	0.01
	16-Jun-99	ND	0.005	0.01
	13-Jul-99	ND	0.005	0.01
	12-Aug-99	ND	0.005	0.01
	13-Sep-99	ND	0.005	0.01
	12-Oct-99	ND	0.005	0.01
	16-Nov-99	ND	0.005	0.01
	15-Dec-99	ND	0.005	0.01
	14-Apr-99	ND	0.0027	0.01
	13-May-99	ND	0.005	0.01
69SW0014	28-Jan-99	ND	0.005	0.01
	22-Feb-99	ND	0.005	0.01
	23-Mar-99	ND	0.005	0.01
	14-Apr-99	ND	0.0027	0.01
	13-May-99	ND	0.005	0.01
	16-Jun-99	ND	0.005	0.01
	13-Jul-99	ND	0.005	0.01
	12-Aug-99	ND	0.005	0.01
	13-Sep-99	ND	0.005	0.01
	12-Oct-99	ND	0.005	0.01
	16-Nov-99	ND	0.005	0.01
	15-Dec-99	ND	0.005	0.01
	14-Apr-99	ND	0.0027	0.01
	13-May-99	ND	0.005	0.01

**Table 4-7**  
**FS-28 1999 Surface Water Concentrations of Ethylene Dibromide (EDB)**

Location ID	Date	EDB (µg/L)	Detection Limit	Reporting Limit
69SW0019	6-Apr-99	0.025	0.005	0.01
	7-Apr-99	0.011	0.005	0.01
	8-Apr-99	ND	0.005	0.01
	9-Apr-99	0.013	0.005	0.01
	12-Apr-99	0.01	0.005	0.01
	13-Apr-99	0.011	0.005	0.01
	14-Apr-99	0.012	0.005	0.01
	15-Apr-99	ND	0.005	0.01
	16-Apr-99	ND	0.005	0.01
	21-Apr-99	0.01	0.005	0.01
	28-Apr-99	ND	0.005	0.01
	16-Jun-99	ND	0.005	0.01
	24-Jun-99	ND	0.005	0.01
	30-Jun-99	ND	0.005	0.01
	12-Jul-99	ND	0.005	0.01
	11-Aug-99	ND	0.005	0.01
	13-Sep-99	ND	0.005	0.01
	11-Oct-99	ND	0.005	0.01
	15-Nov-99	ND	0.005	0.01
	15-Dec-99	ND	0.005	0.01
69SW0024	28-Jan-99	0.006J	0.005	0.01
	22-Feb-99	ND	0.005	0.01
	23-Mar-99	0.051	0.005	0.01
	6-Apr-99	0.015	0.005	0.01
	7-Apr-99	0.011	0.005	0.01
	8-Apr-99	ND	0.005	0.01
	9-Apr-99	0.01	0.005	0.01
	12-Apr-99	ND	0.005	0.01
	13-Apr-99	0.011	0.005	0.01
	14-Apr-99	0.014	0.005	0.01
	15-Apr-99	ND	0.005	0.01
	16-Apr-99	ND	0.005	0.01
	21-Apr-99	0.01	0.005	0.01
	28-Apr-99	ND	0.005	0.01
	3-May-99	0.009J	0.005	0.01
	5-May-99	ND	0.005	0.01
	13-May-99	ND	0.005	0.01
	16-Jun-99	ND	0.005	0.01
	24-Jun-99	ND	0.005	0.01
	13-Jul-99	ND	0.005	0.01
	12-Aug-99	ND	0.005	0.01
	13-Sep-99	ND	0.005	0.01
	12-Oct-99	ND	0.005	0.01
	16-Nov-99	ND	0.005	0.01
	15-Dec-99	ND	0.005	0.01

**Table 4-7**  
**FS-28 1999 Surface Water Concentrations of Ethylene Dibromide (EDB)**

Location ID	Date	EDB (µg/L)	Detection Limit	Reporting Limit
69SW0046	28-Jan-99	ND	0.005	0.01
	22-Feb-99	0.041	0.005	0.01
	23-Mar-99	0.039	0.005	0.01
	14-Apr-99	0.0088J	0.0027	0.01
	12-May-99	ND	0.005	0.01
	16-Jun-99	ND	0.005	0.01
	13-Jul-99	ND	0.005	0.01
	12-Aug-99	ND	0.005	0.01
	14-Sep-99	ND	0.005	0.01
	11-Oct-99	ND	0.005	0.01
	15-Nov-99	ND	0.005	0.01
	15-Dec-99	ND	0.005	0.01
69SW0047	28-Jan-99	ND	0.005	0.01
	22-Feb-99	0.03	0.005	0.01
	23-Mar-99	0.028	0.005	0.01
	14-Apr-99	ND	0.0027	0.01
	12-May-99	ND	0.005	0.01
	16-Jun-99	ND	0.005	0.01
	13-Jul-99	ND	0.005	0.01
	12-Aug-99	ND	0.005	0.01
	11-Oct-99	ND	0.005	0.01
	15-Nov-99	ND	0.005	0.01
	15-Dec-99	ND	0.005	0.01
69SW0048	28-Jan-99	ND	0.005	0.01
	22-Feb-99	0.022	0.005	0.01
	22-Mar-99	0.019	0.005	0.01
	14-Apr-99	ND	0.0027	0.01
	12-May-99	ND	0.005	0.01
	16-Jun-99	ND	0.005	0.01
	12-Jul-99	ND	0.005	0.01
	11-Aug-99	ND	0.005	0.01
	13-Sep-99	ND	0.005	0.01
	11-Oct-99	ND	0.005	0.01
	15-Nov-99	ND	0.005	0.01
	14-Dec-99	ND	0.005	0.01

**Table 4-7**  
**FS-28 1999 Surface Water Concentrations of Ethylene Dibromide (EDB)**

Location ID	Date	EDB (µg/L)	Detection Limit	Reporting Limit
69SW0049	22-Feb-99	0.011	0.005	0.01
	23-Mar-99	0.014	0.005	0.01
	6-Apr-99	0.012	0.005	0.01
	7-Apr-99	ND	0.005	0.01
	8-Apr-99	ND	0.005	0.01
	9-Apr-99	ND	0.005	0.01
	12-Apr-99	ND	0.005	0.01
	13-Apr-99	ND	0.005	0.01
	14-Apr-99	ND	0.005	0.01
	15-Apr-99	ND	0.005	0.01
	16-Apr-99	ND	0.005	0.01
	21-Apr-99	ND	0.005	0.01
	28-Apr-99	ND	0.005	0.01
	3-May-99	ND	0.005	0.01
	5-May-99	ND	0.005	0.01
	12-May-99	ND	0.005	0.01
	16-Jun-99	ND	0.005	0.01
	24-Jun-99	ND	0.005	0.01
	13-Jul-99	ND	0.005	0.01
	12-Aug-99	ND	0.005	0.01
	14-Sep-99	ND	0.005	0.01
	11-Oct-99	ND	0.005	0.01
	15-Nov-99	ND	0.005	0.01
	14-Dec-99	ND	0.005	0.01
69SW0051	27-Jan-99	ND	0.005	0.01
	22-Feb-99	ND	0.005	0.01
	22-Mar-99	ND	0.005	0.01
	14-Apr-99	ND	0.0027	0.01
	12-May-99	ND	0.005	0.01
	16-Jun-99	ND	0.005	0.01
	12-Jul-99	ND	0.005	0.01
	11-Aug-99	ND	0.005	0.01
	13-Sep-99	ND	0.005	0.01
	11-Oct-99	ND	0.005	0.01
	15-Nov-99	ND	0.005	0.01
	14-Dec-99	ND	0.005	0.01

**Table 4-7**  
**FS-28 1999 Surface Water Concentrations of Ethylene Dibromide (EDB)**

Location ID	Date	EDB (µg/L)	Detection Limit	Reporting Limit
69SW0052	27-Jan-99	ND	0.005	0.01
	22-Feb-99	ND	0.005	0.01
	22-Mar-99	ND	0.005	0.01
	14-Apr-99	ND	0.0027	0.01
	12-May-99	ND	0.005	0.01
	16-Jun-99	ND	0.005	0.01
	12-Jul-99	ND	0.005	0.01
	11-Aug-99	ND	0.005	0.01
	13-Sep-99	ND	0.005	0.01
	11-Oct-99	ND	0.005	0.01
	15-Nov-99	ND	0.005	0.01
	14-Dec-99	ND	0.005	0.01
69SW0060	28-Jan-99	ND	0.005	0.01
	22-Feb-99	0.02	0.005	0.01
	23-Mar-99	ND	0.005	0.01
	14-Apr-99	ND	0.0027	0.01
	12-May-99	ND	0.005	0.01
	16-Jun-99	ND	0.005	0.01
	9-Jul-99	ND	0.005	0.01
	13-Jul-99	ND	0.005	0.01
	28-Jul-99	ND	0.005	0.01
	11-Aug-99	ND	0.005	0.01
	25-Aug-99	ND	0.005	0.01
	10-Sep-99	ND	0.005	0.01
	14-Sep-99	ND	0.005	0.01
	22-Sep-99	ND	0.005	0.01
	11-Oct-99	ND	0.005	0.01
	15-Nov-99	ND	0.005	0.01
	15-Dec-99	ND	0.005	0.01
69SW2000	23-Mar-99	ND	0.005	0.01
	14-Apr-99	ND	0.0027	0.01
	13-May-99	ND	0.005	0.01
	16-Jun-99	ND	0.005	0.01
	13-Jul-99	ND	0.005	0.01
	12-Aug-99	ND	0.005	0.01
	13-Sep-99	ND	0.005	0.01
	12-Oct-99	ND	0.005	0.01
	16-Nov-99	ND	0.005	0.01
	15-Dec-99	ND	0.005	0.01

**Table 4-7**  
**FS-28 1999 Surface Water Concentrations of Ethylene Dibromide (EDB)**

Location ID	Date	EDB (µg/L)	Detection Limit	Reporting Limit
69SW2001	28-Jan-99	ND	0.005	0.01
	22-Feb-99	0.037	0.005	0.01
	23-Mar-99	ND	0.005	0.01
	14-Apr-99	ND	0.0027	0.01
	12-May-99	ND	0.005	0.01
	16-Jun-99	ND	0.005	0.01
	13-Jul-99	ND	0.005	0.01
	12-Aug-99	ND	0.005	0.01
	14-Sep-99	ND	0.005	0.01
	11-Oct-99	ND	0.005	0.01
	15-Nov-99	ND	0.005	0.01
	15-Dec-99	ND	0.005	0.01
69SW2002	28-Jan-99	ND	0.005	0.01
	22-Feb-99	0.015	0.005	0.01
	22-Mar-99	ND	0.005	0.01
	14-Apr-99	ND	0.0027	0.01
	12-May-99	ND	0.005	0.01
	16-Jun-99	ND	0.005	0.01
	12-Jul-99	ND	0.005	0.01
	11-Aug-99	ND	0.005	0.01
	13-Sep-99	ND	0.005	0.01
	11-Oct-99	ND	0.005	0.01
	15-Nov-99	ND	0.01	0.02
	14-Dec-99	ND	0.005	0.01
69SW2003	28-Jan-99	ND	0.005	0.01
	22-Feb-99	ND	0.005	0.01
	22-Mar-99	ND	0.005	0.01
	14-Apr-99	ND	0.0027	0.01
	12-May-99	ND	0.005	0.01
	16-Jun-99	ND	0.005	0.01
	12-Jul-99	ND	0.005	0.01
	11-Aug-99	ND	0.005	0.01
	13-Sep-99	ND	0.005	0.01
	11-Oct-99	ND	0.005	0.01
	15-Nov-99	ND	0.005	0.01
	14-Dec-99	ND	0.005	0.01

**Table 4-7**  
**FS-28 1999 Surface Water Concentrations of Ethylene Dibromide (EDB)**

Location ID	Date	EDB (µg/L)	Detection Limit	Reporting Limit
69SW2004	28-Jan-99	ND	0.005	0.01
	23-Mar-99	ND	0.005	0.01
	14-Apr-99	ND	0.0027	0.01
	13-May-99	ND	0.005	0.01
	16-Jun-99	ND	0.005	0.01
	13-Jul-99	ND	0.005	0.01
	12-Aug-99	ND	0.005	0.01
	13-Sep-99	ND	0.005	0.01
	11-Oct-99	ND	0.005	0.01
	16-Nov-99	ND	0.005	0.01
	15-Dec-99	ND	0.005	0.01
69SW2005	28-Jan-99	ND	0.005	0.01
	22-Feb-99	ND	0.005	0.01
	23-Mar-99	ND	0.005	0.01
	14-Apr-99	ND	0.0027	0.01
	12-May-99	ND	0.005	0.01
	16-Jun-99	ND	0.005	0.01
	13-Jul-99	ND	0.005	0.01
	12-Aug-99	ND	0.005	0.01
	14-Sep-99	ND	0.005	0.01
	11-Oct-99	ND	0.005	0.01
	15-Nov-99	ND	0.005	0.01
	15-Dec-99	ND	0.005	0.01
69SW2006	28-Jan-99	ND	0.005	0.01
	22-Feb-99	ND	0.005	0.01
	22-Mar-99	ND	0.005	0.01
	14-Apr-99	ND	0.0027	0.01
	12-May-99	ND	0.005	0.01
	16-Jun-99	ND	0.005	0.01
	12-Jul-99	ND	0.005	0.01
	11-Aug-99	ND	0.025	0.05
	13-Sep-99	ND	0.005	0.01
	11-Oct-99	ND	0.005	0.01
	15-Nov-99	ND	0.005	0.01
	14-Dec-99	ND	0.005	0.01

**Table 4-7**  
**FS-28 1999 Surface Water Concentrations of Ethylene Dibromide (EDB)**

Location ID	Date	EDB (µg/L)	Detection Limit	Reporting Limit
69SW2007	28-Jan-99	ND	0.005	0.01
	22-Feb-99	ND	0.005	0.01
	22-Mar-99	ND	0.005	0.01
	14-Apr-99	ND	0.0027	0.01
	12-May-99	ND	0.005	0.01
	16-Jun-99	ND	0.005	0.01
	12-Jul-99	ND	0.005	0.01
	11-Aug-99	ND	0.005	0.01
	13-Sep-99	ND	0.005	0.01
	11-Oct-99	ND	0.005	0.01
	15-Nov-99	ND	0.005	0.01
	14-Dec-99	ND	0.005	0.01
69SW2008	27-Jan-99	ND	0.005	0.01
	22-Feb-99	ND	0.005	0.01
	22-Mar-99	ND	0.005	0.01
	14-Apr-99	ND	0.0027	0.01
	3-May-99	ND	0.005	0.01
	5-May-99	ND	0.005	0.01
	12-May-99	ND	0.005	0.01
	16-Jun-99	ND	0.005	0.01
	12-Jul-99	ND	0.005	0.01
	11-Aug-99	ND	0.005	0.01
	13-Sep-99	ND	0.005	0.01
	11-Oct-99	ND	0.005	0.01
	15-Nov-99	ND	0.005	0.01
	14-Dec-99	ND	0.005	0.01
69SW2009	27-Jan-99	ND	0.005	0.01
	22-Feb-99	ND	0.005	0.01
	22-Mar-99	ND	0.005	0.01
	14-Apr-99	ND	0.0027	0.01
	12-May-99	ND	0.005	0.01
	16-Jun-99	ND	0.005	0.01
	12-Jul-99	ND	0.005	0.01
	11-Aug-99	ND	0.005	0.01
	13-Sep-99	ND	0.005	0.01
	11-Oct-99	ND	0.005	0.01
	15-Nov-99	ND	0.005	0.01
	14-Dec-99	ND	0.005	0.01
69SW2010	22-Mar-99	ND	0.005	0.01

**Table 4-7**  
**FS-28 1999 Surface Water Concentrations of Ethylene Dibromide (EDB)**

Location ID	Date	EDB (µg/L)	Detection Limit	Reporting Limit
69SW2011	27-Jan-99	ND	0.005	0.01
	22-Feb-99	ND	0.005	0.01
	22-Mar-99	ND	0.005	0.01
	14-Apr-99	ND	0.0027	0.01
	12-May-99	ND	0.005	0.01
	16-Jun-99	ND	0.005	0.01
	12-Jul-99	ND	0.005	0.01
	11-Aug-99	ND	0.005	0.01
	13-Sep-99	ND	0.005	0.01
	20-Sep-99	ND	0.005	0.01
	11-Oct-99	ND	0.005	0.01
	15-Nov-99	ND	0.005	0.01
69SW2012	27-Jan-99	ND	0.005	0.01
	22-Feb-99	ND	0.005	0.01
	22-Mar-99	ND	0.005	0.01
	14-Apr-99	ND	0.0027	0.01
	12-May-99	ND	0.005	0.01
	12-Jul-99	ND	0.005	0.01
	13-Sep-99	ND	0.005	0.01
	20-Sep-99	ND	0.005	0.01
	11-Oct-99	ND	0.005	0.01
	15-Nov-99	ND	0.005	0.01
	14-Dec-99	ND	0.005	0.01
69SW2013	28-Jan-99	ND	0.005	0.01
	23-Mar-99	0.032	0.005	0.01
	14-Apr-99	ND	0.0027	0.01
	13-May-99	ND	0.005	0.01
	16-Jun-99	ND	0.005	0.01
	13-Jul-99	ND	0.005	0.01
	12-Aug-99	ND	0.005	0.01
	14-Sep-99	ND	0.005	0.01
	11-Oct-99	ND	0.005	0.01
	16-Nov-99	ND	0.005	0.01
	15-Dec-99	ND	0.005	0.01

**Table 4-7**  
**FS-28 1999 Surface Water Concentrations of Ethylene Dibromide (EDB)**

Location ID	Date	EDB (µg/L)	Detection Limit	Reporting Limit
69SW2014	28-Jan-99	ND	0.005	0.01
	22-Feb-99	0.026	0.005	0.01
	23-Mar-99	0.036	0.005	0.01
	14-Apr-99	0.0084J	0.0027	0.01
	12-May-99	ND	0.005	0.01
	16-Jun-99	ND	0.005	0.01
	13-Jul-99	ND	0.005	0.01
	12-Aug-99	ND	0.005	0.01
	14-Sep-99	ND	0.005	0.01
	11-Oct-99	ND	0.005	0.01
	15-Nov-99	ND	0.005	0.01
	15-Dec-99	ND	0.005	0.01
69SW2018	15-Dec-99	ND	0.005	0.01
69SW2019	14-Dec-99	ND	0.005	0.01

J - estimated concentration

EDB - ethylene dibromide

µg/L - micrograms per liter

ND - not detected

**Table 4-8**  
**FS-28 Coonamessett River and Bogs Field Parameters**  
**January - December 1999**

**Coonamessett River**  
**Temperature (°C)**

<b>SAMPLING</b>	<b>Jan-99</b>	<b>Feb-99</b>	<b>Mar-99</b>	<b>Apr-99</b>	<b>May-99</b>	<b>Jun-99</b>	<b>Jul-99</b>	<b>Aug-99</b>	<b>Sep-99</b>	<b>Oct-99</b>	<b>Nov-99</b>	<b>Dec-99</b>
69SW0058	NS	2.30	2.29	11.35	18.03	20.72	21.42	NS*	23.25	15.86	NS*	NS*
69SW0003	NS	NS	2.38	11.45	17.53	18.07	19.76	24.35	22.42	NS*	NS*	NS*
69SW0006	3.52	2.68	2.08	11.36	17.01	24.35	19.57	23.83	21.24	13.88	10.48	6.73
69SW0065	NS	3.88	4.69	11.39	12.81	12.53	14.48	12.37	12.95	12.04	11.55	10.44
69SW0065 continuous reading	7.15	8.54	5.52	11.23	14.88	13.71	13.43	12.67	12.53	12.00	11.77	11.31
69SW0010	NS	10.23	6.63	11.97	13.35	14.05	14.07	13.13	14.07	12.04	10.33	11.18
69SW0019	NS	10.33	6.77	12.35	14.53	18.76	24.51	18.14	16.36	11.95	11.32	9.74
69SW0024	4.39	7.61	6.59	12.47	14.77	20.08	12.03	17.11	18.79	11.63	11.04	9.41
69SW0046	5.11	4.65	5.72	12.97	18.86	18.62	14.96	15.80	17.06	14.73	10.98	9.28
69SW0047	4.76	3.80	5.26	11.83	15.87	20.15	15.57	15.27	17.26	14.60	10.77	9.06
69SW0048	4.45	3.84	9.83	11.25	14.27	20.60	22.08	16.07	15.57	10.69	9.49	9.03
69SW0049	NS	4.49	4.83	10.49	14.19	18.47	14.75	14.98	15.52	14.89	8.98	8.95
69SW2008	5.66	2.92	9.12	10.98	15.44	25.39	25.79	21.60	22.28	16.02	7.89	5.59
69SW0051	5.75	3.89	9.22	11.38	17.01	21.14	22.31	18.66	18.05	15.46	8.45	6.91
69SW0052	4.99	2.67	9.30	11.16	16.58	22.70	23.61	19.06	19.02	15.60	8.58	7.22
69SW2009	5.00	3.34	9.21	11.10	16.52	20.24	23.54	19.50	19.13	15.70	8.44	7.16

**Dissolved Oxygen (mg/L)**

<b>LOCATION</b>	<b>Jan-99</b>	<b>Feb-99</b>	<b>Mar-99</b>	<b>Apr-99</b>	<b>May-99</b>	<b>Jun-99</b>	<b>Jul-99</b>	<b>Aug-99</b>	<b>Sep-99</b>	<b>Oct-99</b>	<b>Nov-99</b>	<b>Dec-99</b>
69SW0058	NS	13.23	15.69	10.66	9.89	2.53	6.52	NS*	7.41	10.27	NS*	NS*
69SW0003	NS	NS	15.14	10.40	10.88	4.85	6.38	3.34	7.66	NS*	NS*	NS*
69SW0006	13.50	13.40	14.88	10.33	9.94	6.83	6.27	3.17	6.78	5.64	3.99	8.46
69SW0065	NS	9.52	12.56	10.44	10.32	9.34	7.35	7.77	7.33	9.00	7.55	6.49
69SW0065 continuous reading												
monthly means	10.85	10.38	9.82	9.73	9.12	9.11	8.55	6.99	7.48	7.40	7.79	7.51
69SW0010	NS	8.19	13.70	9.80	10.16	10.16	7.75	8.88	9.4	8.73	11.40	8.93
69SW0019	NS	7.85	10.65	9.76	11.37	10.40	8.54	11.59	11.01	11.66	10.71	10.42
69SW0024	12.41	7.7	13.17	10.55	12.07	9.95	2.59	12.22	11.90	11.12	11.97	11.01
69SW0046	7.60	10.58	13.24	9.99	10.73	4.57	5.87	9.51	11.8	12.73	11.61	10.43
69SW0047	11.12	11.43	12.56	10.31	10.55	6.30	6.03	8.11	10.64	11.5	11.43	10.30
69SW0048	10.44	12.99	9.96	10.55	11.25	8.50	10.00	10.59	9.17	11.19	11.64	6.62
69SW0049	NS	13.25	12.68	10.34	11.48	10.6	7.20	8.09	8.89	8.62	10.41	10.65
69SW2008	10.62	14.87	12.51	12.22	9.25	9.92	12.29	9.31	10.13	9.91	12.65	12.62
69SW0051	11.27	13.70	12.34	10.72	11.09	10.24	10.39	7.90	7.14	8.52	10.33	11.15
69SW0052	12.26	14.49	11.85	11.26	12.83	10.32	11.80	9.97	9.43	8.83	11.25	12.03
69SW2009	11.41	14.00	11.87	11.13	12.44	11.16	9.97	11.20	9.79	9.20	11.88	11.27

**Table 4-8**  
**FS-28 Coonamessett River and Bogs Field Parameters**  
**January - December 1999**

pH

LOCATION	Jan-99	Feb-99	Mar-99	Apr-99	May-99	Jun-99	Jul-99	Aug-99	Sep-99	Oct-99	Nov-99	Dec-99
69SW0058	NS	6.80	6.81	6.36	6.46	6.51	5.95	NS*	6.41	7.31	NS*	NS*
69SW0003	NS	NS	6.77	6.29	6.52	6.42	5.94	6.64	6.53	NS*	NS*	NS*
69SW0006	5.85	6.47	6.58	6.26	6.27	6.39	6.19	6.6	6.22	6.38	6.26	5.72
69SW0065	NS	6.39	6.42	6.73	6.30	6.86	6.34	6.59	6.26	6.50	6.42	6.52
69SW0010	NS	6.69	6.45	5.96	6.57	7.02	6.43	6.99	6.8	6.78	6.48	6.78
69SW0019	NS	6.53	6.34	6.01	6.63	6.06	6.75	6.88	5.95	6.31	6.52	6.95
69SW0024	5.90	6.75	6.42	6.58	6.4	6.06	6.27	6.63	6.19	6.49	6.66	7.02
69SW0046	5.97	7.08	6.57	6.20	6.60	7.14	5.95	6.44	7.4	6.78	6.80	7.02
69SW0047	6.51	6.91	6.43	6.16	6.65	6.68	5.91	6.74	6.50	6.66	6.61	7.11
69SW0048	6.61	6.91	6.31	6.67	6.47	6.84	6.79	6.13	6.00	7.06	6.66	6.06
69SW0049	NS	7.07	6.51	6.92	7.05	7.04	6.27	7.01	6.58	6.61	6.74	6.65
69SW2008	6.52	6.99	6.90	7.09	6.75	7.26	8.50	6.89	6.66	6.56	6.93	6.70
69SW0051	6.31	6.89	6.50	7.01	7.05	6.56	8.16	6.69	6.68	6.55	6.55	6.57
69SW0052	6.23	7.40	6.48	7.05	7.23	7.45	7.08	6.22	6.83	6.68	7.35	6.77
69SW2009	6.24	7.94	6.49	6.93	7.44	7.57	7.34	6.36	6.77	7.29	7.40	6.72

Specific Conductivity (µS/cm)

LOCATION	Jan-99	Feb-99	Mar-99	Apr-99	May-99	Jun-99	Jul-99	Aug-99	Sep-99	Oct-99	Nov-99	Dec-99
69SW0058	NS	84	83	83	87	94	83	NS*	88	87	NS*	NS*
69SW0003	NS	NS	83	82	68	77	80	128	88	NS*	NS*	NS*
69SW0006	82	82	83	83	86	87	80	131	88	225	177	205
69SW0065	NS	85	80	82	75	80	80	87	83	79	67	78
69SW0010	NS	77	79	81	83	79	80	86	83	79	81	78
69SW0019	NS	77	80	80	74	81	88	90	84	81	80	80
69SW0024	76	77	79	80	82	81	77	88	82	81	66	80
69SW0046	95	77	28	80	80	76	73	81	83	79	80	79
69SW0047	61	77	80	81	82	175	77	83	82	82	81	79
69SW0048	75	77	91	81	90	170	79	95	82	81	81	110
69SW0049	NS	81	82	85	83	130	80	85	253	84	82	70
69SW2008	82	84	84	83	81	173	93	99	81	80	83	81
69SW0051	73	91	86	92	94	78	99	110	97	88	96	85
69SW0052	87	91	70	87	88	185	94	103	90	89	78	88
69SW2009	75	99	86	87	88	182	79	102	90	89	78	88

**Table 4-8**  
**FS-28 Coonamessett River and Bogs Field Parameters**  
**January - December 1999**

**Oxidation-Reduction Potential (mV)**

LOCATION	Jan-99	Feb-99	Mar-99	Apr-99	May-99	Jun-99	Jul-99	Aug-99	Sep-99	Oct-99	Nov-99	Dec-99
69SW0058	NS	323	232	179	394	446	362	NS*	291	305	NS*	NS*
69SW0003	NS	NS	228	176	391	454	358	222	328	NS*	NS*	NS*
69SW0006	138	166	237	163	407	136	338	205	337	333	107	337
69SW0065	NS	320	224	123	403	429	300	263	278	335	189	116
69SW0010	NS	296	205	148	413	406	318	227	319	327	133	144
69SW0019	NS	300	221	144	142	85	44	233	357	360	167	145
69SW0024	125	328	200	110	444	86	301	224	318	330	135	148
69SW0046	147	335	189	130	194	54	372	394	322	323	154	156
69SW0047	197	355	183	107	110	-12	368	389	333	333	141	169
69SW0048	192	226	327	114	135	-10	94	252	363	333	194	132
69SW0049	NS	221	199	117	190	-5.3	317	383	149	250	125	125
69SW2008	196	231	289	129	154	-23	106	224	328	317	151	120
69SW0051	198	238	298	127	183	74	108	247	326	320	144	116
69SW0052	193	262	307	106	130	-17	174	255	312	316	126	124
69SW2009	210	239	309	126	164	-31	200	218	307	290	168	117

**Turbidity (NTU)**

LOCATION	Jan-99	Feb-99	Mar-99	Apr-99	May-99	Jun-99	Jul-99	Aug-99	Sep-99	Oct-99	Nov-99	Dec-99
69SW0058	NS	2.1	1.8	1.3	1.4	12	2.0	NS*	30	1.5	NS*	NS*
69SW0003	NS	NS	1.5	1.3	0.8	1.0	1.6	2	29	NS*	NS*	NS*
69SW0006	3.9	4.6	2.1	1.2	1.4	1.5	2.5	3.4	0.3	2.9	1.7	21
69SW0065	NS	13	4.2	2.5	1.2	5.3	1.4	0.5	28	0.6	0.6	16
69SW0010	NS	0.0	3.4	2.8	0.9	2.3	1.9	0.0	44	2.3	22	21
69SW0019	NS	0.5	2.2	6.9	1.3	2.1	6.7	4.6	1.3	0.9	2.3	0.7
69SW0024	5.8	1.9	15	3.2	5.2	4.5	16	1.8	7.1	1.0	1.4	29
69SW0046	1.1	4.1	14	1.7	6.5	13	4.7	1.4	1.0	0.9	1.8	1.0
69SW0047	1.7	1.5	17	1.9	3.2	6.2	5.6	1.6	3.1	1.2	1.7	1.2
69SW0048	1.8	12	4.5	3.0	39	11	2.9	5.4	1.0	1.6	4.3	25
69SW0049	NS	15	13	1.5	1.1	3.2	9.7	2.5	0.6	2.6	7.9	1.2
69SW2008	3.1	10	3.5	3.1	4.3	9.0	Not Read	0.7	0.4	0.4	1.7	1.1
69SW0051	3.2	6.3	4.4	1.5	2.1	5.1	0.8	2.5	301	1.0	2.2	2.5
69SW0052	1.3	33	3.3	1.9	1.4	1.2	2.4	0.9	0.9	1.3	6.7	1.9
69SW2009	1.0	19	3.6	1.3	7.9	1.9	2.7	1.4	0.6	1.1	3.8	2.4

\*C - degrees Celsius  
 mg/L - milligrams per liter

mV - millivolts  
 µS/cm - microsiemens per centimeter

ntu - nephelometric turbidity units  
 NS - not sampled

NS\* - not sampled due to low flow

**Table 4-9**  
**FS-28 1999 Treatment Plant Process Water Quality Parameters and Concentrations of Ethylene Dibromide (EDB)**

Sampling Date	Location ID	Location	EDB (µg/L)	Temp (°C)	DO (mg/L)	pH (std)	SpC (µS/cm)	ORP (mV)	Turbidity (ntu)
4-Jan-99	69PLT01001	Influent	0.972	11.31	5.58	5.88	80	233	-0.4
	69PLT01002	Intermediate	ND	11.43	6.44	5.93	78	231	-0.3
	69PLT01010	Effluent	ND	11.52	6.51	5.86	79	159	0.0
1-Feb-99	69PLT01001	Influent	0.594	11.51	3.75	6.38	101	232	-0.2
	69PLT01002	Intermediate	ND	11.49	4.15	6.02	79	230	-0.6
	69PLT01010	Effluent	ND	11.42	5.86	5.84	78	147	6.2
2-Mar-99	69PLT01001	Influent	0.638	11.49	4.54	6.20	81	182	0.4
	69PLT01002	Intermediate	ND	11.54	4.17	6.05	79	188	-0.1
	69PLT01010	Effluent	ND	11.54	6.90	5.90	77	137	1.0
1-Apr-99	69PLT01001	Influent	0.668	11.73	3.54	5.89	82	291	0.2
	69PLT01002	Intermediate	ND	11.62	3.51	5.80	79	287	0.1
	69PLT01010	Effluent	ND	11.57	3.03	5.60	78	197	0.6
6-Apr-99	69PLT01001	Influent	1.89	11.47	8.72	6.28	76	133	0.0
	69PLT01002	Intermediate	0.037	11.17	8.76	5.98	75	191	0.1
	69PLT01010	Effluent	ND	11.64	8.41	5.9	75	143	4.3
7-Apr-99	69PLT01001	Influent	1.68	12.27	9.21	6.38	77	136	1.7
	69PLT01002	Intermediate	0.045	11.99	8.83	6.22	75	185	0.1
	69PLT01010	Effluent	ND	12.12	8.46	6.02	75	210	0.3
9-Apr-99	69PLT01001	Influent	1.67	12.00	8.52	6.51	77	157	0.4
	69PLT01010	Effluent	ND	11.98	8.88	6.34	75	174	4.3
11-Apr-99	69PLT01001	Influent	1.40	11.96	8.81	6.37	76	155	0.0
	69PLT01010	Effluent	ND	12.00	8.76	6.24	74	181	1.5
14-Apr-99	69PLT01001	Influent	1.24	NM	NM	NM	NM	NM	NM
	69PLT01010	Effluent	ND	NM	NM	NM	NM	NM	NM
16-Apr-99	69PLT01001	Influent	0.828	11.84	6.56	6.02	79	208	0.2
	69PLT01002	Intermediate	0.048	11.66	6.98	6.01	76	261	0.0
	69PLT01010	Effluent	ND	11.71	6.27	5.98	76	240	1.0
18-Apr-99	69PLT01001	Influent	1.15	11.55	6.12	6.02	83	231	-0.3
	69PLT01010	Effluent	ND	11.59	5.76	5.97	77	197	0.7
23-Apr-99	69PLT01001	Influent	1.15	11.53	7.28	6.14	78	180	0.0
	69PLT01003	Intermediate	ND	11.57	7.43	6.07	77	213	1.6
25-Apr-99	69PLT01001	Influent	0.996	12.49	7.86	6.20	79	204	0.1
	69PLT01003	Intermediate	ND	12.00	6.27	5.88	77	238	0.1
27-Apr-99	69PLT01001	Influent	1.04	11.79	7.80	6.53	78	175	2.2
	69PLT01003	Intermediate	ND	11.70	7.10	6.39	76	191	0.3
29-Apr-99	69PLT01001	Influent	0.861	11.47	6.23	5.84	76	196	-0.2
	69PLT01003	Intermediate	ND	11.92	6.58	5.91	78	235	0.0

**Table 4-9**  
**FS-28 1999 Treatment Plant Process Water Quality Parameters and Concentrations of Ethylene Dibromide (EDB)**

Sampling Date	Location ID	Location	EDB (µg/L)	Temp (°C)	DO (mg/L)	pH (std)	SpC (µS/cm)	ORP (mV)	Turbidity (ntu)
4-May-99	69PLT01001	Influent	0.925	11.78	8.15	6.24	82	206	0.4
	69PLT01003	Intermediate	ND	11.70	7.20	6.05	76	201	0.1
	69PLT01010	Effluent	ND	11.59	6.86	5.93	76	184	0.1
7-May-99	69PLT01001	Influent	0.833	11.62	9.57	6.27	76	187	2.0
	69PLT01003	Intermediate	ND	12.25	6.21	6.07	78	208	0.7
13-May-99	69PLT01001	Influent	0.711	11.94	6.53	5.9	82	218	2.6
	69PLT01003	Intermediate	ND	11.88	6.17	5.82	79	209	0.2
21-May-99	69PLT01001	Influent	0.949	13.00	6.23	5.84	79	220	0.1
	69PLT01003	Intermediate	ND	12.38	6.40	5.86	80	244	0.3
	69PLT01010	Effluent	ND	12.21	5.60	5.80	79	211	0.7
2-Jun-99	69PLT01001	Influent	0.995	12.65	7.16	5.78	79	221	0.7
	69PLT01003	Intermediate	ND	13.10	6.51	5.76	78	240	0.2
	69PLT01010	Effluent	ND	13.11	5.60	5.68	79	183	0.6
6-Jul-99	69PLT01001	Influent	0.606	13.09	5.41	6.05	83	254	0.1
	69PLT01003	Intermediate	ND	12.61	4.32	5.93	81	265	0.0
	69PLT01010	Effluent	ND	12.94	5.85	5.82	82	190	0.2
3-Aug-99	69PLT01001	Influent	0.615	12.90	4.31	6.28	84	268	0.1
	69PLT01003	Intermediate	0.011	12.92	4.08	5.88	82	274	0.1
	69PLT01010	Effluent	ND	12.69	2.22	5.62	81	245	0.2
9-Aug-99	69PLT01001	Influent	0.869	12.75	3.17	6.15	83	307	-0.1
	69PLT01003	Intermediate	0.016	12.39	2.83	5.86	80	309	-0.3
	69PLT01010	Effluent	ND	12.57	2.19	5.77	80	271	3.5
12-Aug-99	69PLT01001	Influent	0.729	13.00	4.31	6.03	84	271	-0.2
	69PLT01003	Intermediate	0.02	12.58	3.82	5.84	81	273	-0.3
	69PLT01010	Effluent	ND	12.62	2.85	5.77	47	192	0.1
14-Aug-99	69PLT01001	Influent	0.559	12.81	5.99	6.12	82	263	-0.1
	69PLT01003	Intermediate	0.015	12.48	6.02	5.84	81	277	-0.3
	69PLT01010	Effluent	ND	12.47	5.36	5.72	81	225	-0.2

**Table 4-9**  
**FS-28 1999 Treatment Plant Process Water Quality Parameters and Concentrations of Ethylene Dibromide (EDB)**

Sampling Date	Location ID	Location	EDB (µg/L)	Temp (°C)	DO (mg/L)	pH (std)	SpC (µS/cm)	ORP (mV)	Turbidity (ntu)
16-Aug-99	69PLT01001	Influent	0.58	12.60	6.31	6.08	86	262	0.6
	69PLT01003	Intermediate	0.015	12.33	6.19	5.87	81	286	-0.3
	69PLT01010	Effluent	ND	12.31	5.01	5.66	81	240	-0.2
17-Aug-99	69PLT01001	Influent	0.616	12.92	5.14	6.10	86	278	0.3
	69PLT01003	Intermediate	0.021	12.75	4.80	5.90	81	299	-0.3
	69PLT01010	Effluent	ND	12.73	3.97	5.81	81	264	1.7
19-Aug-99	69PLT01001	Influent	0.512	13.33	5.54	5.90	84	254	0.1
	69PLT01003	Intermediate	0.026	12.57	5.13	5.77	81	278	-0.1
	69PLT01010	Effluent	ND	12.62	4.20	5.68	81	251	0.5
23-Aug-99	69PLT01001	Influent	0.74	12.65	5.63	6.10	83	266	0.2
	69PLT01003	Intermediate	0.025	12.44	5.10	5.94	80	274	-0.2
	69PLT01010	Effluent	ND	12.42	4.26	5.78	80	254	3
7-Sep-99	69PLT01001	Influent	0.668	12.62	6.08	5.63	81	286	-0.2
	69PLT01002	Intermediate	ND	12.56	5.24	5.60	80	303	-0.3
	69PLT01010	Effluent	ND	13.05	4.11	5.67	80	223	2.5
1-Oct-99	69PLT01001	Influent	0.574	12.75	6.63	5.84	84	281	-0.3
	69PLT01002	Intermediate	ND	12.25	5.23	5.66	81	259	-0.3
	69PLT01010	Effluent	ND	12.34	4.39	5.60	80	251	0.2
29-Oct-99	69PLT01001	Influent	0.675	12.45	9.04	6.14	90	192	0.5
	69PLT01002	Intermediate	ND	12.22	10.95	6.07	81	211	-0.1
	69PLT01010	Effluent	ND	12.27	10.68	6.00	81	186	18.2
30-Nov-99	69PLT01001	Influent	0.649	11.51	6.90	6.16	64	243	-1.8
	69PLT01002	Intermediate	0.049	11.60	6.23	6.01	60	222	-1.7
	69PLT01010	Effluent	ND	11.62	5.02	5.93	80	217	-1.8

°C = degrees Celsius

DO = dissolved oxygen

µg/L = micrograms per liter

µS/cm = microsiemens per centimeter

mg/L = milligrams per liter

mV = millivolts

ND = nondetect

ntu = nephelometric turbidity units

ORP = oxidation-reduction potential

Q = qualifier

SPC = specific conductivity

std = standard unit

U = analyte not detected at detection limit

EDB aquatic screening level benchmarks: acute = 554 µg/L and chronic = 31 µg/L, AFCEE 1998. *Draft Final Ethylene Dibromide Derivation of Aquatic Screening Benchmarks*. Prepared by S. Talmadge, Life Science Division, Oak Ridge National Laboratory, Oak Ridge, TN.

Dates and locations of carbon exchanges in 1999: Carbon was exchanged in vessel 101A on 20 April 1999 and 16 December 1999. Carbon was exchanged in vessel 101B on 24 August 1999.

**Table 4-10**  
**FS-28 Treatment System Emissions Assessment Data**

Sample ID	Date	Matrix	Method	EDB Result	Detection Limit	Units
69PLT01020-01	01/07/2000	WW	E504	0.340	0.010	µg/L
69PLT01020-02	01/07/2000	WW	E504	0.365	0.010	µg/L
69PLT01020-03	01/07/2000	WW	E504	0.369	0.010	µg/L
69PLT01020-04	01/07/2000	WW	E504	0.372	0.010	µg/L
69PLT01020-05	01/07/2000	WW	E504	0.384	0.010	µg/L
69PLT01020-06	01/07/2000	WW	E504	0.427	0.010	µg/L
69PLT01021-01	01/07/2000	WW	E504	0.454	0.010	µg/L
69PLT01021-02	01/07/2000	WW	E504	0.358	0.010	µg/L
69PLT01021-03	01/07/2000	WW	E504	0.345	0.010	µg/L
69PLT01021-04	01/07/2000	WW	E504	0.361	0.010	µg/L
69PLT01021-05	01/07/2000	WW	E504	0.364	0.010	µg/L
69PLT01021-06	01/07/2000	WW	E504	0.394	0.010	µg/L
69PLT01017	01/07/2000	AA	Modified TO-14	ND	7.2	ng/m <sup>3</sup>
69PLT01022	01/07/2000	AA	Modified TO-14	ND	7.2	ng/m <sup>3</sup>
ECAAVP201	01/07/2000	AA	Modified TO-14	ND	7.2	ng/m <sup>3</sup>
ECAAVP701	01/07/2000	AA	Modified TO-14	ND	7.1	ng/m <sup>3</sup>
ECAAVP701-FD	01/07/2000	AA	Modified TO-14	ND	7.1	ng/m <sup>3</sup>
Lab blank	01/07/2000	AA	Modified TO-14	ND	5.7	ng/m <sup>3</sup>

AA = matrix code for air samples

ND = nondetect

ng/m<sup>3</sup> = nanograms per cubic meter

WW = matrix code for treatment plant water samples

µg/L = micrograms per liter

**Table 5-1**  
**Comparison of FS-28 1999 Treatment Plant Effluent and Surface Water Concentrations to Ecological Benchmarks**

Location	Analyte	Frequency of Detection	Minimum Concentration	Maximum Concentration	Units	Ecological Based Benchmark	Source *	Benchmark Exceeded?
FS-28 Treatment Plant Effluent	Antimony (total)	1/6	2.6	2.6	µg/L	3.9	Tier II	Yes
	Barium (total)	4/6	3	8.4	µg/L			
	Calcium (total)	6/6	2920	3540	µg/L			
	Copper (total)	1/6	0.93	0.93	µg/L	1000	AWQC	No
	Iron (total)	2/6	98.1	110	µg/L			
	Lead (total)	1/6	0.001	0.001	µg/L			
	Magnesium (total)	6/6	1440	1670	µg/L	80	AWQC	No
	Manganese (total)	6/6	3.9	21.5	µg/L			
	Potassium (total)	5/6	784	1140	µg/L			
	Sodium (total)	6/6	7320	8510	µg/L	32	AWQC	Yes
	Zinc (total)	5/6	37.6	154	µg/L			
	Bromide	5/11	0.013	0.04	mg/L			
	Total Dissolved Solids	5/5	23	52	mg/L			
	Suspended Solids (Residue, Non-Filt	3/5	4	37	mg/L			
	Bromide	5/11	0.013	0.04	mg/L			
	Chloride (AS CL)	11/11	9.6	11.8	mg/L			
	Nitrogen, Nitrate (AS N)	10/11	0.12	0.25	mg/L			
	Phosphorus, Total PO4 (AS P)	1/11	0.07	0.07	mg/L			
	Sulfate (AS SO4)	11/11	4.6	8.9	mg/L			
	Alkalinity, Total (AS CaCO3)	9/9	10.1	16.2	mg/L			
	Dissolved Organic Carbon	6/11	0.2	2	mg/L			
	Total Organic Carbon	2/11	0.26	0.28	mg/L			
Coonamesset River	Alkalinity, Total (AS CaCO3)	6/8	9.12	J 15	µg/L	31	Tier II	No
	Chlorophyll a	5/6	0.1	6.6	µg/L			
	Nitrogen	8/8	217	2250	µg/L			
	Nitroegn, Ammonia (AS N)	4/8	8.3	1600	µg/L			
	Nitrogen, Nitrite	5/8	0.7	J 13.1	µg/L			
	Phosphorus, Total (AS P)	8/8	15.2	309	µg/L			
	Phosphorus, Total PO4 (AS P)	7/8	0.9	J 229	µg/L			
	EDB	15/75	0.006	J 0.051	µg/L			

AFCEE (Air Force Center for Environmental Excellence) 1998. *Draft Final Ethylene Dibromide Derivation of Aquatic Screening Benchmarks*. Prepared by S. Talmadge, Life Science Division, Oak Ridge National Laboratory, Oak Ridge, TN.

\* EPA, 1996. ECO Update. Office of Solid Waste and Emergency Response, Publication No. 9345.0-12FSI.

Washington DC., U.S. Government Printing Office.

AWQC - ambient water quality criteria

Tier II - risk level of  $1 \times 10^{-3}$  and hazard quotient of 10

J - estimated concentration

µg/L - micrograms per liter

mg/L - milligrams per liter

# **APPENDIX A**

## **Data Summary Report**

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## ACRONYMS AND ABBREVIATIONS

AFCEE	U.S. Air Force Center for Environmental Excellence
APHA	American Public Health Association
AQBS	Aquatec Biological Services, Burlington, Vermont
AWWA	American Water Works Association
COC	chain-of-custody
DOC	dissolved organic carbon
DQO	data quality objective
EB	equipment blank
EPA	U. S. Environmental Protection Agency
FD	field duplicate
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
Loc ID	location identification
MDL	method detection limit
MMR	Massachusetts Military Reservation
MS	matrix spike
MSD	matrix spike duplicate
QC	quality control
QPP	<i>Quality Program Plan</i>
RL	reporting limit
RPD	relative percent difference
SOP	standard operating procedure
SVTU	Severn Trent Laboratories, University Park, Illinois
TB	trip blank
TOC	total organic carbon
WPCF	Water Pollution Control Federation

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## 1.0 SAMPLE COLLECTION

Jacobs Engineering Group Inc. collected 14 native groundwater and four native surface water samples to obtain sufficient data to meet the objectives of the *Final Work Plan for the Ecological Assessment Associated with Groundwater Plumes and Remedial Activities* (AFCEE 1998b) and the *FS-28 Groundwater Extraction, Treatment and Surface Water Discharge System Ecological Sampling Strategy* (AFCEE 1999). Samples were collected between June 30, 1999 and January 6, 2000 and were submitted to Severn Trent Laboratories (SVTU) in University Park, Illinois, and Aquatec Biological Services (AQBS) in Burlington, Vermont for analysis. Field quality control (QC) samples were also collected and submitted for analysis at the frequency indicated in the Massachusetts Military Reservation (MMR) *Quality Program Plan* (QPP) (AFCEE 1998a) and included field duplicate samples and equipment blanks. Samples were also collected and submitted for matrix spike and matrix spike duplicate analyses and/or laboratory replicate and matrix spike analyses.

Actual sample locations and analyses are summarized in Section 2.0.

## 2.0 SAMPLE IDENTIFICATION

Table 2-1 lists the native samples and associated field QC samples that were collected in this sampling event and submitted for analysis. Each unique Jacobs chain-of-custody (COC) control number is cross-referenced with location identification (Loc ID), sample number, date sampled, and the analyses performed on each sample. Data completeness (Loc IDs and requested analyses) is verified against the COC forms during the data review process. The MMR data management group maintains all COC forms in project files.

**Table 2-1**  
**Sample Identification Cross-Reference and Analyses**

Location	Sample Number	Sample Type	Matrix	Date Sampled	Alkalinity & Micronutrients	Chlorophyll-a	TOC and/or DOC	Laboratory	Control Number
69MW1304	69MW1304-15	N1	WG	06/30/1999	X			SVTU	OT-E668801
69MW1304	69MW1304-15	N1	WG	06/30/1999			X	SVTU	OT-E668802
69MW1304	69MW1304-15	N1	WG	06/30/1999			X	SVTU	OT-E668803
69MW1304	69MW1304-15	N1	WG	06/30/1999	X			AQBS	OT-E668804
69MW1310	69MW1310-11	N1	WG	06/30/1999	X			SVTU	OT-E668707
69MW1310	69MW1310-11	N1	WG	06/30/1999			X	SVTU	OT-E668708
69MW1310	69MW1310-11	N1	WG	06/30/1999			X	SVTU	OT-E668709
69MW1310	69MW1310-11	N1	WG	06/30/1999	X			AQBS	OT-E668603
FIELDQC	063099-EB1-901	EB	WQ	06/30/1999	X			SVTU	OT-E668501
FIELDQC	063099-EB1-901	EB	WQ	06/30/1999			X	SVTU	OT-E668502
FIELDQC	063099-EB1-901	EB	WQ	06/30/1999			X	SVTU	OT-E668503
FIELDQC	063099-EB1-901	EB	WQ	06/30/1999	X			AQBS	OT-E668401
69MW1304	69MW1304-32	N1	WG	07/27/1999	X			SVTU	OT-E670007
69MW1304	69MW1304-32	N1	WG	07/27/1999			X	SVTU	OT-E670008
69MW1304	69MW1304-32	N1	WG	07/27/1999			X	SVTU	OT-E670009
69MW1304	69MW1304-25	N1	WG	07/27/1999	X			AQBS	OT-E669803
69MW1310	69MW1310-32	N1	WG	07/27/1999	X			SVTU	OT-E670004
69MW1310	69MW1310-32	N1	WG	07/27/1999			X	SVTU	OT-E670005
69MW1310	69MW1310-32	N1	WG	07/27/1999			X	SVTU	OT-E670006
69MW1310	69MW1310-21	N1	WG	07/27/1999	X			AQBS	OT-E669802
69SW0006	69SW0006-73	N1	WS	08/11/1999	X			SVTU	OT-E690001
69SW0006	69SW0006-73	N1	WS	08/11/1999			X	SVTU	OT-E690002
69SW0006	69SW0006-72	N1	WS	08/11/1999		X		AQBS	OT-E689901
69SW0006	69SW0006-72	N1	WS	08/11/1999	X			AQBS	OT-E689902
69SW0065	69SW0065-26	N1	WS	08/11/1999	X			SVTU	OT-E692201
69SW0065	69SW0065-26	N1	WS	08/11/1999			X	SVTU	OT-E692202
69SW0065	69SW0065-25	N1	WS	08/11/1999		X		AQBS	OT-E692101
69SW0065	69SW0065-25	N1	WS	08/11/1999	X			AQBS	OT-E692102
69MW1304	69MW1304-33	N1	WG	08/25/1999			X	SVTU	OT-E700007
69MW1304	69MW1304-33	N1	WG	08/25/1999			X	SVTU	OT-E700008
69MW1304	69MW1304-33	N1	WG	08/25/1999	X			SVTU	OT-E700009
69MW1304	69MW1304-33	N1	WG	08/25/1999	X			AQBS	OT-E700203
69MW1310	69MW1310-33	N1	WG	08/25/1999			X	SVTU	OT-E700004
69MW1310	69MW1310-33	N1	WG	08/25/1999			X	SVTU	OT-E700005
69MW1310	69MW1310-33	N1	WG	08/25/1999	X			SVTU	OT-E700006
69MW1310	69MW1310-33	N1	WG	08/25/1999	X			AQBS	OT-E700202
69MW1304	69MW1304-35	N1	WG	09/29/1999			X	SVTU	OT-E704001
69MW1304	69MW1304-35	N1	WG	09/29/1999			X	SVTU	OT-E704002
69MW1304	69MW1304-35	N1	WG	09/29/1999	X			SVTU	OT-E704003
69MW1304	69MW1304-35	N1	WG	09/29/1999	X			AQBS	OT-E704301
69MW1310	69MW1310-34	N1	WG	09/29/1999			X	SVTU	OT-E703901
69MW1310	69MW1310-34	N1	WG	09/29/1999			X	SVTU	OT-E703902
69MW1310	69MW1310-34	N1	WG	09/29/1999	X			SVTU	OT-E703903
69MW1310	69MW1310-34	N1	WG	09/29/1999	X			AQBS	OT-E704201
69MW1304	69MW1304-	N1	WG	10/29/1999			X	SVTU	OT-E722404
69MW1304	69MW1304-	N1	WG	10/29/1999			X	SVTU	OT-E722405
69MW1304	69MW1304-	N1	WG	10/29/1999	X			SVTU	OT-E722406
69MW1304	69MW1304-	N1	WG	10/29/1999	X			AQBS	OT-E722502
69MW1310	69MW1310-	N1	WG	10/29/1999			X	SVTU	OT-E722401
69MW1310	69MW1310-	N1	WG	10/29/1999			X	SVTU	OT-E722402
69MW1310	69MW1310-	N1	WG	10/29/1999	X			SVTU	OT-E722403

Location	Sample Number	Sample Type	Matrix	Date Sampled	Alkalinity & Micronutrients	Chlorophyll-a	TOC and/or DOC	Laboratory	Control Number
69MW1310	69MW1310-	N1	WG	10/29/1999	X			AQBS	OT-E722501
69SW0006	69SW0006-77	N1	WS	11/15/1999	X			SVTU	OT-E720401
69SW0006	69SW0006-77	N1	WS	11/15/1999			X	SVTU	OT-E720402
69SW0006	69SW0006-77FD	FD1	WS	11/15/1999	X			SVTU	OT-E720403
69SW0006	69SW0006-77FD	FD1	WS	11/15/1999			X	SVTU	OT-E720404
69SW0006	69SW0006-77	N1	WS	11/15/1999	X			AQBS	OT-E720502
69SW0006	69SW0006-77FD	FD1	WS	11/15/1999	X			AQBS	OT-E720504
69SW0006	69SW0006-77	N1	WS	11/15/1999		X		AQBS	OT-E720501
69SW0006	69SW0006-77FD	FD1	WS	11/15/1999		X		AQBS	OT-E720503
69SW0065	69SW0065-27	N1	WS	11/15/1999	X			SVTU	OT-E720601
69SW0065	69SW0065-27	N1	WS	11/15/1999			X	SVTU	OT-E720602
69SW0065	69SW0065-27	N1	WS	11/15/1999	X			AQBS	OT-E720702
69SW0065	69SW0065-27	N1	WS	11/15/1999		X		AQBS	OT-E720701
69MW1304	69MW1304-	N1	WG	11/30/1999			X	SVTU	OT-E732704
69MW1304	69MW1304-	N1	WG	11/30/1999			X	SVTU	OT-E732705
69MW1304	69MW1304-	N1	WG	11/30/1999	X			SVTU	OT-E732706
69MW1304	69MW1304-	N1	WG	11/30/1999	X			AQBS	OT-E732102
69MW1310	69MW1310-	N1	WG	11/30/1999			X	SVTU	OT-E732701
69MW1310	69MW1310-	N1	WG	11/30/1999			X	SVTU	OT-E732702
69MW1310	69MW1310-	N1	WG	11/30/1999	X			SVTU	OT-E732703
69MW1310	69MW1310-	N1	WG	11/30/1999	X			AQBS	OT-E732101
69MW1310	69MW1310-	N1	WG	01/04/2000			X	SVTU	OT-E734301
69MW1310	69MW1310-	N1	WG	01/04/2000			X	SVTU	OT-E734302
69MW1310	69MW1310-	N1	WG	01/04/2000	X			SVTU	OT-E734303
69MW1310	69MW1310-FD	FD1	WG	01/04/2000			X	SVTU	OT-E734304
69MW1310	69MW1310-FD	FD1	WG	01/04/2000			X	SVTU	OT-E734305
69MW1310	69MW1310-FD	FD1	WG	01/04/2000	X			SVTU	OT-E734306
69MW1310	69MW1310-	N1	WG	01/04/2000	X			AQBS	OT-E734401
69MW1310	69MW1310-FD	FD1	WG	01/04/2000	X			AQBS	OT-E734402
69MW1304	69MW1304-	N1	WG	01/06/2000			X	SVTU	OT-E736601
69MW1304	69MW1304-	N1	WG	01/06/2000			X	SVTU	OT-E736602
69MW1304	69MW1304-	N1	WG	01/06/2000	X			SVTU	OT-E736603
69MW1304	69MW1304-	N1	WG	01/06/2000	X			AQBS	OT-E736701

AQBS = Aquatec Biological Services, Burlington, Vermont

DOC = dissolved organic carbon

EB = equipment blank

FD1 = field duplicate sample

Micronutrients = nitrate, nitrite, total nitrogen, total phosphorus, orthophosphate, ammonia

N1 = native sample

SVTU = Severn Trent Laboratories, University Park, Illinois

TOC = total organic carbon

WG = groundwater; WS = surface water; WQ = water quality matrix

### 3.0 LABORATORY ANALYSES

Groundwater samples were analyzed by AQBS for micronutrients (nitrate, nitrite, total nitrogen, total phosphorus, orthophosphate and ammonia) and by SVTU for alkalinity, dissolved organic carbon (DOC) and total organic carbon (TOC). Surface water samples were analyzed by AQBS for micronutrients and chlorophyll-a and by SVTU for

alkalinity and TOC. Most analyses were performed according to established U.S. Environmental Protection Agency (EPA) methods specified in the MMR QPP (AFCEE 1998a) and the *Final Work Plan for the Ecological Assessment Associated with Groundwater Plumes and Remedial Activities* (AFCEE 1998b) and the *FS-28 Groundwater Extraction, Treatment and Surface Water Discharge System Ecological Sampling Strategy* (AFCEE 1999). Analytical methods from *Standard Methods for the Examination of Water and Wastewater* (APHA-AWWA-WPCF 1995) were used for determining micronutrient (nitrate, nitrite, orthophosphate, and ammonia) and chlorophyll-*a* concentrations. Low level total nitrogen and total phosphorus analyses were performed according to the method outlined in *The Simultaneous Analysis of Total Nitrogen and Total Phosphorus in Natural Waters* (Valderrama 1981). These non-EPA methods were added to the analytical program in February 1998 in order to achieve lower reporting limits (RLs) for micronutrients in aqueous samples.

#### 4.0 DATA VALIDATION

All data is reviewed in accordance with MMR project-specific data review guidelines, which are defined in the MMR technical procedure TECH-055, Analytical Chemistry Data Review (AFCEE 1998a). Data for samples is validated at either Level D, which includes a review of the summary forms and raw data, or Level C, which includes a review of the summary form information only.

The following qualifiers are applied to the data during the review process:

- U – The analyte was not detected at the specified detection limit.
- J – The analyte was detected and the reported concentration is an estimated value.
- UJ – The analyte was not detected and the nondetect value is estimated due to QC noncompliance.
- R – The analyte value was rejected and the result is unusable.

EPA Contract Laboratory Program method-specific qualifiers and other laboratory-specific qualifiers used to designate noncompliant values were either accepted or replaced with one of the data validation qualifiers. Data validation qualifiers were entered into the database from which the results of this sampling event were reported.

## **5.0 PRECISION, ACCURACY, REPRESENTATIVENESS, COMPLETENESS AND COMPARABILITY**

Data quality is assessed in terms of precision, accuracy, representativeness, completeness, and comparability. The goals set for each of these parameters are referred to as data quality objectives (DQOs). Actual sample and QC results are compared to project DQOs to determine whether quality objectives were met for the sampling event.

### **5.1 PRECISION**

Precision is defined as the degree to which two or more measurements are in agreement. Precision is measured by comparing duplicate sample results and is expressed as the relative percent difference (RPD) of analyte concentrations (for native and field duplicate samples and/or native and laboratory replicate samples), matrix spike and/or laboratory control sample spike recoveries.

#### **5.1.1 Field Precision**

Field duplicates (FDs) are collected by taking two aliquots of the same sequential aqueous sample, containerizing the samples, and submitting them to the laboratory for analysis as two separate samples. The RPD criterion is 30 percent for aqueous samples when the concentrations in the native sample and the FD sample are greater than five times the reporting limit (RL). For duplicate results exceeding these criteria, the native sample and the FD sample are qualified as estimated (coded J), indicating possible field sampling error and/or possible sample nonhomogeneity.

FDs were collected at the frequency stated in the MMR QPP (AFCEE 1998a). One FD sample was collected with the native groundwater samples and one FD sample was collected with the native surface water samples during this sampling event. Other FD samples, not discussed in this data summary report, were also collected with the groundwater and surface water samples as part of the larger ecological sampling program. RPD criteria were met for both FD sample pairs, indicating the use of good

sampling techniques; qualifications were not required. FD results for all detected target analytes are presented in Table 5-1.

**Table 5-1**  
**Field Duplicate Precision Results for Detected Analytes**

Location	Analyte	Date Sampled	Native Sample Result	Duplicate Sample Result	RL	Units	RPD
69MW1310	ALKALINITY, TOTAL (AS CaCO <sub>3</sub> )	1/4/00	18.3	17.7	5	mg/L	3.3
	NITROGEN		295	302	30	µg/L	2.3
	NITROGEN, NITRATE (AS N)		294	294	3	µg/L	0
	NITROGEN, NITRITE		0.500 J	0.400 J	3	µg/L	22.2
	PHOSPHORUS, TOTAL (AS P)		41.6	41.6	3	µg/L	0
	PHOSPHORUS, TOTAL PO <sub>4</sub> (AS P)		39.5	39.2	2	µg/L	0.8
	DISSOLVED ORGANIC CARBON		ND	1.7	1	mg/L	NC
69SW0006	ALKALINITY, TOTAL (AS CaCO <sub>3</sub> )	11/15/99	15	14.9	10	mg/L	0.7
	NITROGEN		726	719	30	µg/L	1
	NITROGEN, AMMONIA (AS N)		47.3	43.8	10	µg/L	7.7
	NITROGEN, NITRATE (AS N)		52	53.3	3	µg/L	2.5
	NITROGEN, NITRITE		13.1	10.8	3	µg/L	19.2
	PHOSPHORUS, TOTAL (AS P)		309	305	30	µg/L	1.3
	PHOSPHORUS, TOTAL PO <sub>4</sub> (AS P)		229	235	8	µg/L	2.6
	CHLOROPHYLL A		0.800 J	0.400 J	0.1	µg/L	66.7
	TOTAL ORGANIC CARBON		14.6	14.4	1	mg/L	1.4

mg/L = milligram per liter  
NC = not calculated

ND = nondetect result  
RL = reporting limit

RPD = relative percent difference  
µg/L = microgram per liter

### 5.1.2 LABORATORY PRECISION

Laboratory precision is measured by the analysis of matrix spike and matrix spike duplicate (MS/MSD) samples, laboratory control samples and laboratory control sample duplicates (LCS/LCSDs) (required by Jacobs when MS/MSD samples are not designated on the COC), and/or laboratory replicate samples. These samples are analyzed at the frequency stated in the MMR QPP (AFCEE 1998a) for all parameters except chlorophyll-*a*. Precision objectives (such as RPDs) for respective analyses are included in the methods. For MS/MSD and laboratory replicate RPDs exceeding these criteria, the result in the parent sample is qualified as estimated (coded UJ or J). For LCS/LCSD RPDs exceeding the criteria, all samples in the associated batch are qualified as estimated (coded UJ or J).

The RPDs for the LCS/LCSD sample analyses, laboratory replicate analyses and for the MS/MSD sample analyses for organic parameters were within the acceptance criteria; qualifications were not required.

## **5.2 ACCURACY**

Accuracy is defined as the degree to which the detected value represents the true value. Accuracy is assessed through the collection and analysis of blanks (field and laboratory) and other QC samples or spikes.

### **5.2.1 Field Accuracy**

Accuracy in the field is assessed through the collection and analysis of equipment blanks (EBs) and trip blanks (TBs). The procedures used to collect these blanks are described in the MMR QPP (AFCEE 1998a).

Contamination in blanks indicates that false positive results or results that are biased high may exist for samples associated with the affected blanks. To address this, action levels are established based on blank concentrations and compared to the sample results. During data review, sample data is qualified as nondetect (coded U) based on TB and EB results when the analyte result in the associated sample is less than five times the result in the TB and EB (10 times for common laboratory contaminants such as acetone, methyl ethyl ketone [also known as 2-butanone], methylene chloride, and phthalates). Additional qualifiers due to other QC nonconformances are occasionally included, changing the nondetect (coded U) qualifier to, for example, an estimated nondetect (coded UJ) qualifier.

EBs were collected at the frequency stated in the MMR QPP (AFCEE 1998a) for all parameters except chlorophyll-*a*. One EB was collected for the groundwater samples during this sampling event. Other EB samples, not discussed in this data summary report, were also collected with the groundwater samples as part of the larger ecological sampling program. EBs were not required for surface water samples since they were

collected using dedicated sampling equipment. Trip blanks were not required for any analyses in this data set.

*Qualification of sample results was not required due to field blank results.* Based on the results of the EBs, no systematic pattern of contamination indicative of improperly cleaned equipment or poor sampling technique appears to exist.

## **5.2.2 Laboratory Accuracy**

Accuracy in the laboratory is measured by a variety of means, including (1) sample holding times and preservation, (2) instrument calibration, and (3) analysis of QC samples such as laboratory blanks, MSs, and LCSs. Accuracy is quantitatively measured by calculating percent recoveries for MSs, LCSs, and surrogates.

### **5.2.2.1 Sample Holding Times and Preservation**

When samples are analyzed beyond their respective holding times or if the laboratory receives a cooler in which the temperature exceeds six degrees Celsius, positive results are suspected to be biased low, and nondetect results are suspected to be false negatives. Analytical results acquired from analyses performed after the method-specified holding times are rejected (coded R). If sample coolers are received at a temperature greater than six degrees Celsius, the results for these samples are qualified as estimated (coded J or UJ).

All samples collected as part of this sampling event met holding time and preservation requirements; qualifications were not required.

### **5.2.2.2 Instrument Calibration**

Instrument calibration parameters are reviewed for conformance to method and data review criteria according to the technical procedure MMR TECH-055, Analytical Chemistry Data Review (AFCEE 1998a).

Initial and continuing calibration criteria were acceptable for all analyses; qualifications were not required.

### 5.2.2.3 Laboratory Blanks

Laboratory blanks are prepared and/or analyzed along with each batch of field samples. Laboratory blanks are evaluated against their associated (same preparation and/or analytical batch) field samples to determine if a laboratory condition contributed to false positives or high bias in the field samples. Associated sample data is qualified in the same manner as field blanks.

Results for the native samples that were qualified because of laboratory blank contamination are listed in Table 5-2.

**Table 5-2**  
**Laboratory Blank Sample Qualification**

Location	Sample ID	Date Sampled	Analyte	Qualifier	Matrix
69MW1304	69MW1304-15	06/30/1999	DISSOLVED ORGANIC CARBON	U	WG
69MW1304	69MW1304-15	06/30/1999	NITROGEN, AMMONIA (AS N)	U	WG
69MW1304	69MW1304-15	06/30/1999	NITROGEN, NITRITE	U	WG
69MW1304	69MW1304-15	06/30/1999	TOTAL ORGANIC CARBON	U	WG
69MW1304	69MW1304-25	07/27/1999	NITROGEN, NITRITE	U	WG
69MW1304	69MW1304-32	07/27/1999	TOTAL ORGANIC CARBON	U	WG
69MW1304	69MW1304-33	08/25/1999	NITROGEN, NITRITE	U	WG
69MW1304	69MW1304-33	08/25/1999	TOTAL ORGANIC CARBON	U	WG
69MW1304	69MW1304-35	09/29/1999	TOTAL ORGANIC CARBON	U	WG
69MW1304	69MW1304-	11/30/1999	NITROGEN, NITRITE	U	WG
69MW1304	69MW1304-	01/06/2000	DISSOLVED ORGANIC CARBON	U	WG
69MW1304	69MW1304-	01/06/2000	NITROGEN, NITRITE	U	WG
69MW1304	69MW1304-	01/06/2000	TOTAL ORGANIC CARBON	U	WG
69MW1310	69MW1310-11	06/30/1999	DISSOLVED ORGANIC CARBON	U	WG
69MW1310	69MW1310-11	06/30/1999	NITROGEN, AMMONIA (AS N)	U	WG
69MW1310	69MW1310-11	06/30/1999	TOTAL ORGANIC CARBON	U	WG

Location	Sample ID	Date Sampled	Analyte	Qualifier	Matrix
69MW1310	69MW1310-21	07/27/1999	NITROGEN, NITRITE	U	WG
69MW1310	69MW1310-32	07/27/1999	TOTAL ORGANIC CARBON	U	WG
69MW1310	69MW1310-33	08/25/1999	NITROGEN, NITRITE	U	WG
69MW1310	69MW1310-33	08/25/1999	TOTAL ORGANIC CARBON	U	WG
69MW1310	69MW1310-34	09/29/1999	DISSOLVED ORGANIC CARBON	U	WG
69MW1310	69MW1310-34	09/29/1999	TOTAL ORGANIC CARBON	U	WG
69MW1310	69MW1310-	11/30/1999	ALKALINITY, TOTAL (AS CaCO <sub>3</sub> )	U	WG
69MW1310	69MW1310-	11/30/1999	NITROGEN, NITRITE	U	WG
69SW0006	69SW0006-73	08/11/1999	ALKALINITY, TOTAL (AS CaCO <sub>3</sub> )	U	WS
69SW0065	69SW0065-26	08/11/1999	ALKALINITY, TOTAL (AS CaCO <sub>3</sub> )	U	WS
69SW0065	69SW0065-25	08/11/1999	NITROGEN, NITRITE	U	WS
69SW0065	69SW0065-26	08/11/1999	TOTAL ORGANIC CARBON	U	WS
69SW0065	69SW0065-27	11/15/1999	TOTAL ORGANIC CARBON	U	WS

CaCO<sub>3</sub> = calcium carbonate

U = undetected result

WG = groundwater; WS = surface water

Contaminants were detected in the associated blanks for the following general chemistry parameters: alkalinity, DOC, TOC, nitrite, and ammonia. The RLs used for these parameters are often much greater than the actual method detection limits (MDLs). The laboratory is required to report all results to the MDL. Thus, blanks frequently contain low levels of analytes that fall between the MDL and the RL. Associated sample data were evaluated against these blank levels. Positive results less than five times the blank levels were considered false positives and qualified as nondetect (coded U) at the reported value.

#### 5.2.2.4 Matrix Spikes

Accuracy objectives (as percent recoveries) for the analytes spiked into MS/MSD samples are included in the respective methods. For MS/MSD percent recoveries exceeding these criteria, the result in the parent sample is qualified as estimated (coded UJ or J). In cases where recoveries of spiked analytes are extremely low (less than 10 percent for organic analyses), the result in the parent sample is rejected (coded R).

MS/MSD samples were analyzed at the frequency stated in the MMR QPP (AFCEE 1998a) for all parameters except chlorophyll-*a*. One MS/MSD analysis was performed on a groundwater sample for alkalinity, TOC, DOC, and micronutrient parameters during this sampling event. Other MS/MSD samples, not discussed in this data summary report,

were also collected with the groundwater and surface water samples as part of the larger ecological sampling program. MS/MSD samples were not collected for surface water during this sampling event.

MS/MSD percent recoveries for all analyses were within the acceptance criteria; qualifications were not required.

#### **5.2.2.5 Laboratory Control Samples**

Accuracy objectives (as percent recoveries) for analytes spiked into LCS/LCSD samples are included in the respective methods. For LCS/LCSD percent recoveries exceeding these criteria, the results for the samples in the preparation/extraction batch or the analytical batch associated with the noncompliant LCS/LCSD are qualified as estimated (coded UJ or J).

LCS/LCSD samples, which are required for all analyses under the Jacobs laboratory subcontract, were analyzed and reported in data packages when MS/MSD analyses were not designated on the COC.

LCS/LCSD percent recoveries for all analyses were within the acceptance criteria; qualifications were not required.

### **5.3 REPRESENTATIVENESS**

Representativeness expresses the degree to which data collected for a sample accurately and precisely represents the in situ conditions of the sample. Representativeness is a qualitative parameter that is dependent upon the proper design of the sampling program and proper laboratory protocol. Sampling plans are designed to provide data representative of the areas of investigation.

Representativeness was satisfied by ensuring that the *Final Work Plan for the Ecological Assessment Associated with Groundwater Plumes and Remedial Activities* (AFCEE 1998b) and the *FS-28 Groundwater Extraction, Treatment and Surface Water Discharge*

*System Ecological Sampling Strategy* (AFCEE 1999) were followed, proper sampling techniques were used, proper analytical procedures were followed, and holding times of the samples were not exceeded in the laboratory.

## **5.4 COMPLETENESS**

Completeness is a measure of the amount of valid, usable data obtained compared to the amount of data that is expected under normal conditions. Completeness can be measured in the field and in the laboratory. The goals for field and laboratory completeness are 95 percent for aqueous samples.

### **5.4.1 Field Completeness**

Field completeness is a measure of the number of samples collected for a particular sampling event compared to the number of samples that were planned.

All field samples and field QC samples were collected and submitted for analysis in accordance with the MMR QPP (AFCEE 1998a) and the *Final Work Plan for the Ecological Assessment Associated with Groundwater Plumes and Remedial Activities* (AFCEE 1998b) and the *FS-28 Groundwater Extraction, Treatment and Surface Water Discharge System Ecological Sampling Strategy* (AFCEE 1999).

### **5.4.2 Laboratory Completeness**

Laboratory completeness is assessed by comparing the number of samples successfully analyzed to the number submitted, and the number of valid measurements (nonrejected results) to the number of measurements expected.

All samples submitted were successfully analyzed (100 percent completeness). The completeness goal for valid measurements was met for all parameters.

Table 5-3 is a summary of the laboratory completeness assessment.

**Table 5-3**  
**Laboratory Completeness**

Analysis	Percent Completeness (%)
DOC	100/100
TOC	100/100
Alkalinity	100/100
Micronutrients	100/100
Chlorophyll-a	100/100

Percent completeness is expressed as the number of samples successfully analyzed compared to the number submitted, and the number of valid measurements (nonrejected results) compared to the number of measurements expected, respectively.

## 5.5 COMPARABILITY

Comparability expresses the confidence with which one data set can be compared to another. For this sampling event, comparability was achieved through the use of proper sampling and analytical techniques, reporting data in standard units, normalizing results to standard conditions, and by using standard comprehensive reporting formats.

## 6.0 SENSITIVITY

Sensitivity is assessed by comparing the actual RLs reported by the laboratory to those specified in the MMR QPP (AFCEE 1998a). However, RLs may be affected by numerous factors, including percent moisture of solid samples, matrix interferences, blank contamination, and sample dilutions.

If necessary, RLs were adjusted due to one or more of these factors as specified in the methods and MMR QPP (AFCEE 1998a).

## 7.0 CORRECTIVE ACTION AND RESOLUTION

Corrective action in the laboratory may occur prior to, during, and after initial analyses. Conditions such as broken sample containers or low/high pH readings of preserved samples may be identified during sample log-in or just prior to analysis. The laboratory notifies the project chemist if conditions such as these are identified; the project chemist provides the laboratory with instructions for corrective action to address these conditions.

Conditions such as the need for dilution of samples for reinjection and/or reanalysis when certain QC criteria are not met are identified by the laboratory according to their standard operating procedures (SOPs). Corrective actions for these conditions are also contained in their SOPs.

Any corrective actions affecting the data from this sampling event were performed prior to release of the data from the laboratory. Corrective actions are documented in the laboratory's corrective action files and the narrative accompanying the hard-copy data package.

## 8.0 SUMMARY

In general, the data collected during this sampling event met the established DQOs and can be considered valid for decision-making purposes.

## 9.0 REFERENCES

- AFCEE (Air Force Center for Environmental Excellence). 1998a (January). *Massachusetts Military Reservation Plume Response Program, Quality Program Plan*. AFC-J23-35Q85101-M3-0001. Prepared by Jacobs Engineering Group Inc. for AFCEE/MMR, Installation Restoration Program, Otis Air National Guard Base, MA.
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- Valderrama, J.C. (1981). The Simultaneous Analysis of Total Nitrogen and Total Phosphorus in Natural Waters. *Marine Chemistry*. 10:109 – 122. Elsevier Scientific Publishing Company: Amsterdam.

## **APPENDIX B**

### **Analytical Laboratory Data**

**Appendix B**  
**Analytical Laboratory Data**  
**June 1999 - January 2000**

Location	Sample ID	Date	Method	Type	Analyte	Matrix	Depth	Result	DL	RL	Units	Qual	Control No.
69MW1304	69MW1304-15	06/30/99	A4500B	N1	NITROGEN, NITRITE	WG	219.18	ND	0.9	4	µg/L	U	OT-E668604
69MW1304	69MW1304-15	06/30/99	A4500E	N1	PHOSPHORUS, TOTAL PO4 (AS P)	WG	219.18	29.4	0.6	2	µg/L		OT-E668604
69MW1304	69MW1304-15	06/30/99	A4500F	N1	NITROGEN, NITRATE (AS N)	WG	219.18	128	1.8	6	µg/L		OT-E668604
69MW1304	69MW1304-15	06/30/99	A4500H	N1	NITROGEN, AMMONIA (AS N)	WG	219.18	ND	2.6	14	µg/L	U	OT-E668604
69MW1304	69MW1304-15	06/30/99	E310.1	N1	ALKALINITY, TOTAL (AS CaCO3)	WG	219.18	16.3	1	10	mg/L		OT-E668801
69MW1304	69MW1304-15	06/30/99	MCTNP	N1	NITROGEN	WG	219.18	125	8.7	30	µg/L		OT-E668604
69MW1304	69MW1304-15	06/30/99	MCTNP	N1	PHOSPHORUS, TOTAL (AS P)	WG	219.18	30.5	1.5	3	µg/L		OT-E668604
69MW1304	69MW1304-15	06/30/99	E415.1	N1	DISSOLVED ORGANIC CARBON	WG	219.18	ND	0.861	1	mg/L	U	OT-E668802
69MW1304	69MW1304-15	06/30/99	E415.1	N1	TOTAL ORGANIC CARBON	WG	219.18	ND	0.278	1	mg/L	U	OT-E668803
69MW1304	69MW1304-25	07/27/99	A4500B	N1	NITROGEN, NITRITE	WG	218.1	ND	1.3	3.5	µg/L	U	OT-E669803
69MW1304	69MW1304-25	07/27/99	A4500E	N1	PHOSPHORUS, TOTAL PO4 (AS P)	WG	218.1	30.2	0.6	2	µg/L		OT-E669803
69MW1304	69MW1304-25	07/27/99	A4500F	N1	NITROGEN, NITRATE (AS N)	WG	218.1	129	0.9	3	µg/L		OT-E669803
69MW1304	69MW1304-25	07/27/99	A4500H	N1	NITROGEN, AMMONIA (AS N)	WG	218.1	0.9	0.9	5	µg/L	J	OT-E669803
69MW1304	69MW1304-32	07/27/99	E310.1	N1	ALKALINITY, TOTAL (AS CaCO3)	WG	218.1	16.9	1	10	mg/L		OT-E670007
69MW1304	69MW1304-25	07/27/99	MCTNP	N1	NITROGEN	WG	218.1	150	8.7	30	µg/L		OT-E669803
69MW1304	69MW1304-25	07/27/99	MCTNP	N1	PHOSPHORUS, TOTAL (AS P)	WG	218.1	33.6	1.5	3	µg/L		OT-E669803
69MW1304	69MW1304-32	07/27/99	E415.1	N1	DISSOLVED ORGANIC CARBON	WG	218.1	1.65	0.11	1	mg/L		OT-E670009
69MW1304	69MW1304-32	07/27/99	E415.1	N1	TOTAL ORGANIC CARBON	WG	218.1	ND	0.275	1	mg/L	U	OT-E670008
69MW1304	69MW1304-33	08/25/99	A4500B	N1	NITROGEN, NITRITE	WG	215.5	ND	0.5	3.75	µg/L	U	OT-E700203
69MW1304	69MW1304-33	08/25/99	A4500E	N1	PHOSPHORUS, TOTAL PO4 (AS P)	WG	215.5	32.1	0.6	2	µg/L		OT-E700203
69MW1304	69MW1304-33	08/25/99	A4500F	N1	NITROGEN, NITRATE (AS N)	WG	215.5	136	0.9	3	µg/L		OT-E700203
69MW1304	69MW1304-33	08/25/99	A4500H	N1	NITROGEN, AMMONIA (AS N)	WG	215.5	ND	5	10	µg/L	U	OT-E700203
69MW1304	69MW1304-33	08/25/99	E310.1	N1	ALKALINITY, TOTAL (AS CaCO3)	WG	215.5	20.4	2.2	10	mg/L		OT-E700009
69MW1304	69MW1304-33	08/25/99	MCTNP	N1	NITROGEN	WG	215.5	150	8.7	30	µg/L		OT-E700203
69MW1304	69MW1304-33	08/25/99	MCTNP	N1	PHOSPHORUS, TOTAL (AS P)	WG	215.5	37.5	1.5	3	µg/L		OT-E700203
69MW1304	69MW1304-33	08/25/99	E415.1	N1	DISSOLVED ORGANIC CARBON	WG	215.5	1.06	0.11	1	mg/L		OT-E700008
69MW1304	69MW1304-33	08/25/99	E415.1	N1	TOTAL ORGANIC CARBON	WG	215.5	ND	0.204	1	mg/L	U	OT-E700007
69MW1304	69MW1304-35	09/29/99	A4500B	N1	NITROGEN, NITRITE	WG	215.5	1.2	0.2	3	µg/L	J	OT-E704301
69MW1304	69MW1304-35	09/29/99	A4500E	N1	PHOSPHORUS, TOTAL PO4 (AS P)	WG	215.5	31.9	0.6	2	µg/L		OT-E704301
69MW1304	69MW1304-35	09/29/99	A4500F	N1	NITROGEN, NITRATE (AS N)	WG	215.5	135	0.9	3	µg/L		OT-E704301
69MW1304	69MW1304-35	09/29/99	A4500H	N1	NITROGEN, AMMONIA (AS N)	WG	215.5	ND	5	10	µg/L	U	OT-E704301
69MW1304	69MW1304-35	09/29/99	E310.1	N1	ALKALINITY, TOTAL (AS CaCO3)	WG	215.5	20	2.2	10	mg/L		OT-E704003
69MW1304	69MW1304-35	09/29/99	MCTNP	N1	NITROGEN	WG	215.5	123	8.7	30	µg/L		OT-E704301
69MW1304	69MW1304-35	09/29/99	MCTNP	N1	PHOSPHORUS, TOTAL (AS P)	WG	215.5	39.4	1.5	3	µg/L		OT-E704301
69MW1304	69MW1304-35	09/29/99	E415.1	N1	DISSOLVED ORGANIC CARBON	WG	215.5	1.04	0.11	1	mg/L		OT-E704002
69MW1304	69MW1304-35	09/29/99	E415.1	N1	TOTAL ORGANIC CARBON	WG	215.5	ND	0.358	1	mg/L	U	OT-E704001
69MW1304	69MW1304-	10/29/99	A4500B	N1	NITROGEN, NITRITE	WG	215.5	0.8	0.2	3	µg/L	J	OT-E722502
69MW1304	69MW1304-	10/29/99	A4500E	N1	PHOSPHORUS, TOTAL PO4 (AS P)	WG	215.5	36.6	0.6	2	µg/L		OT-E722502
69MW1304	69MW1304-	10/29/99	A4500F	N1	NITROGEN, NITRATE (AS N)	WG	215.5	168	0.9	3	µg/L		OT-E722502
69MW1304	69MW1304-	10/29/99	A4500H	N1	NITROGEN, AMMONIA (AS N)	WG	215.5	ND	5	10	µg/L	U	OT-E722502
69MW1304	69MW1304-	10/29/99	E310.1	N1	ALKALINITY, TOTAL (AS CaCO3)	WG	215.5	16.8	2.2	10	mg/L		OT-E722406

**Appendix B**  
**Analytical Laboratory Data**  
**June 1999 - January 2000**

Location	Sample ID	Date	Method	Type	Analyte	Matrix	Depth	Result	DL	RL	Units	Qual	Control No.
69MW1304	69MW1304-	10/29/99	MCTNP	N1	NITROGEN	WG	215.5	143	8.7	30	µg/L		OT-E722502
69MW1304	69MW1304-	10/29/99	MCTNP	N1	PHOSPHORUS, TOTAL (AS P)	WG	215.5	37	1.5	3	µg/L		OT-E722502
69MW1304	69MW1304-	10/29/99	E415.1	N1	DISSOLVED ORGANIC CARBON	WG	215.5	0.965	0.11	1	mg/L	J	OT-E722405
69MW1304	69MW1304-	10/29/99	E415.1	N1	TOTAL ORGANIC CARBON	WG	215.5	0.421	0.11	1	mg/L	J	OT-E722404
69MW1304	69MW1304-	11/30/99	A4500B	N1	NITROGEN, NITRITE	WG	215.5	ND	2.1	7.8	µg/L	U	OT-E732102
69MW1304	69MW1304-	11/30/99	A4500E	N1	PHOSPHORUS, TOTAL PO4 (AS P)	WG	215.5	35.7	0.6	2	µg/L		OT-E732102
69MW1304	69MW1304-	11/30/99	A4500F	N1	NITROGEN, NITRATE (AS N)	WG	215.5	124	0.9	3	µg/L		OT-E732102
69MW1304	69MW1304-	11/30/99	A4500H	N1	NITROGEN, AMMONIA (AS N)	WG	215.5	ND	5	10	µg/L	U	OT-E732102
69MW1304	69MW1304-	11/30/99	E310.1	N1	ALKALINITY, TOTAL (AS CaCO3)	WG	215.5	17.9	2.2	10	mg/L		OT-E732706
69MW1304	69MW1304-	11/30/99	MCTNP	N1	NITROGEN	WG	215.5	157	8.7	30	µg/L		OT-E732102
69MW1304	69MW1304-	11/30/99	MCTNP	N1	PHOSPHORUS, TOTAL (AS P)	WG	215.5	36.5	1.5	3	µg/L		OT-E732102
69MW1304	69MW1304-	11/30/99	E415.1	N1	DISSOLVED ORGANIC CARBON	WG	215.5	0.635	0.11	1	mg/L	J	OT-E732705
69MW1304	69MW1304-	11/30/99	E415.1	N1	TOTAL ORGANIC CARBON	WG	215.5	0.331	0.11	1	mg/L	J	OT-E732704
69MW1304	69MW1304-	01/06/00	A4500B	N1	NITROGEN, NITRITE	WG	215.5	ND	1.9	3	µg/L	U	OT-E736701
69MW1304	69MW1304-	01/06/00	A4500E	N1	PHOSPHORUS, TOTAL PO4 (AS P)	WG	215.5	34.5	0.6	2	µg/L		OT-E736701
69MW1304	69MW1304-	01/06/00	A4500F	N1	NITROGEN, NITRATE (AS N)	WG	215.5	133	0.9	3	µg/L		OT-E736701
69MW1304	69MW1304-	01/06/00	A4500H	N1	NITROGEN, AMMONIA (AS N)	WG	215.5	ND	5	10	µg/L	U	OT-E736701
69MW1304	69MW1304-	01/06/00	E310.1	N1	ALKALINITY, TOTAL (AS CaCO3)	WG	215.5	18.8	2.2	5	mg/L		OT-E736603
69MW1304	69MW1304-	01/06/00	MCTNP	N1	NITROGEN	WG	215.5	139	8.7	30	µg/L		OT-E736701
69MW1304	69MW1304-	01/06/00	MCTNP	N1	PHOSPHORUS, TOTAL (AS P)	WG	215.5	36.9	1.5	3	µg/L		OT-E736701
69MW1304	69MW1304-	01/06/00	E415.1	N1	DISSOLVED ORGANIC CARBON	WG	215.5	ND	1	1.79	mg/L	U	OT-E736601
69MW1304	69MW1304-	01/06/00	E415.1	N1	TOTAL ORGANIC CARBON	WG	215.5	ND	0.64	1.79	mg/L	U	OT-E736602
69MW1310	69MW1310-11	06/30/99	A4500B	N1	NITROGEN, NITRITE	WG	239.75	ND	0.2	3	µg/L	U	OT-E668603
69MW1310	69MW1310-11	06/30/99	A4500E	N1	PHOSPHORUS, TOTAL PO4 (AS P)	WG	239.75	36.7	0.6	2	µg/L		OT-E668603
69MW1310	69MW1310-11	06/30/99	A4500F	N1	NITROGEN, NITRATE (AS N)	WG	239.75	311	9	30	µg/L		OT-E668603
69MW1310	69MW1310-11	06/30/99	A4500H	N1	NITROGEN, AMMONIA (AS N)	WG	239.75	ND	1.6	14	µg/L	U	OT-E668603
69MW1310	69MW1310-11	06/30/99	E310.1	N1	ALKALINITY, TOTAL (AS CaCO3)	WG	239.75	16.3	1	10	mg/L		OT-E668707
69MW1310	69MW1310-11	06/30/99	MCTNP	N1	NITROGEN	WG	239.75	329	8.7	30	µg/L		OT-E668603
69MW1310	69MW1310-11	06/30/99	MCTNP	N1	PHOSPHORUS, TOTAL (AS P)	WG	239.75	38.2	1.5	3	µg/L		OT-E668603
69MW1310	69MW1310-11	06/30/99	E415.1	N1	DISSOLVED ORGANIC CARBON	WG	239.75	ND	0.796	1	mg/L	U	OT-E668708
69MW1310	69MW1310-11	06/30/99	E415.1	N1	TOTAL ORGANIC CARBON	WG	239.75	ND	0.25	1	mg/L	U	OT-E668709
69MW1310	69MW1310-21	07/27/99	A4500B	N1	NITROGEN, NITRITE	WG	239.8	ND	0.5	3.5	µg/L	U	OT-E669802
69MW1310	69MW1310-21	07/27/99	A4500E	N1	PHOSPHORUS, TOTAL PO4 (AS P)	WG	239.8	36.4	0.6	2	µg/L		OT-E669802
69MW1310	69MW1310-21	07/27/99	A4500F	N1	NITROGEN, NITRATE (AS N)	WG	239.8	316	0.9	3	µg/L		OT-E669802
69MW1310	69MW1310-21	07/27/99	A4500H	N1	NITROGEN, AMMONIA (AS N)	WG	239.8	1.7	0.9	5	µg/L	J	OT-E669802
69MW1310	69MW1310-32	07/27/99	E310.1	N1	ALKALINITY, TOTAL (AS CaCO3)	WG	239.8	19.5	1	10	mg/L		OT-E670004
69MW1310	69MW1310-21	07/27/99	MCTNP	N1	NITROGEN	WG	239.8	377	8.7	30	µg/L		OT-E669802
69MW1310	69MW1310-21	07/27/99	MCTNP	N1	PHOSPHORUS, TOTAL (AS P)	WG	239.8	39.6	1.5	3	µg/L		OT-E669802
69MW1310	69MW1310-32	07/27/99	E415.1	N1	DISSOLVED ORGANIC CARBON	WG	239.8	1.84	0.11	1	mg/L		OT-E670006
69MW1310	69MW1310-32	07/27/99	E415.1	N1	TOTAL ORGANIC CARBON	WG	239.8	ND	0.264	1	mg/L	U	OT-E670005
69MW1310	69MW1310-33	08/25/99	A4500B	N1	NITROGEN, NITRITE	WG	235	ND	0.5	3.75	µg/L	U	OT-E700202

**Appendix B**  
**Analytical Laboratory Data**  
**June 1999 - January 2000**

Location	Sample ID	Date	Method	Type	Analyte	Matrix	Depth	Result	DL	RL	Units	Qual	Control No.
69MW1310	69MW1310-33	08/25/99	A4500E	N1	PHOSPHORUS, TOTAL PO4 (AS P)	WG	235	38.2	0.6	2	µg/L		OT-E700202
69MW1310	69MW1310-33	08/25/99	A4500F	N1	NITROGEN, NITRATE (AS N)	WG	235	308	0.9	3	µg/L		OT-E700202
69MW1310	69MW1310-33	08/25/99	A4500H	N1	NITROGEN, AMMONIA (AS N)	WG	235	ND	5	10	µg/L	U	OT-E700202
69MW1310	69MW1310-33	08/25/99	E310.1	N1	ALKALINITY, TOTAL (AS CaCO3)	WG	235	13.7	2.2	10	mg/L		OT-E700006
69MW1310	69MW1310-33	08/25/99	MCTNP	N1	NITROGEN	WG	235	320	8.7	30	µg/L		OT-E700202
69MW1310	69MW1310-33	08/25/99	MCTNP	N1	PHOSPHORUS, TOTAL (AS P)	WG	235	44	1.5	3	µg/L		OT-E700202
69MW1310	69MW1310-33	08/25/99	E415.1	N1	DISSOLVED ORGANIC CARBON	WG	235	0.911	0.11	1	mg/L	J	OT-E700005
69MW1310	69MW1310-33	08/25/99	E415.1	N1	TOTAL ORGANIC CARBON	WG	235	ND	0.247	1	mg/L	U	OT-E700004
69MW1310	69MW1310-34	09/29/99	A4500B	N1	NITROGEN, NITRITE	WG	235	0.3	0.2	3	µg/L	J	OT-E704201
69MW1310	69MW1310-34	09/29/99	A4500E	N1	PHOSPHORUS, TOTAL PO4 (AS P)	WG	235	35.7	0.6	2	µg/L		OT-E704201
69MW1310	69MW1310-34	09/29/99	A4500F	N1	NITROGEN, NITRATE (AS N)	WG	235	307	0.9	3	µg/L		OT-E704201
69MW1310	69MW1310-34	09/29/99	A4500H	N1	NITROGEN, AMMONIA (AS N)	WG	235	ND	5	10	µg/L	U	OT-E704201
69MW1310	69MW1310-34	09/29/99	E310.1	N1	ALKALINITY, TOTAL (AS CaCO3)	WG	235	16.3	2.2	10	mg/L		OT-E703903
69MW1310	69MW1310-34	09/29/99	MCTNP	N1	NITROGEN	WG	235	235	8.7	30	µg/L		OT-E704201
69MW1310	69MW1310-34	09/29/99	MCTNP	N1	PHOSPHORUS, TOTAL (AS P)	WG	235	47.3	1.5	3	µg/L		OT-E704201
69MW1310	69MW1310-34	09/29/99	E415.1	N1	DISSOLVED ORGANIC CARBON	WG	235	ND	0.798	1	mg/L	U	OT-E703902
69MW1310	69MW1310-34	09/29/99	E415.1	N1	TOTAL ORGANIC CARBON	WG	235	ND	0.452	1.3	mg/L	U	OT-E703901
69MW1310	69MW1310-	10/29/99	A4500B	N1	NITROGEN, NITRITE	WG	235	0.2	0.2	3	µg/L	J	OT-E722501
69MW1310	69MW1310-	10/29/99	A4500E	N1	PHOSPHORUS, TOTAL PO4 (AS P)	WG	235	40.4	0.6	2	µg/L		OT-E722501
69MW1310	69MW1310-	10/29/99	A4500F	N1	NITROGEN, NITRATE (AS N)	WG	235	355	0.9	3	µg/L		OT-E722501
69MW1310	69MW1310-	10/29/99	A4500H	N1	NITROGEN, AMMONIA (AS N)	WG	235	ND	5	10	µg/L	U	OT-E722501
69MW1310	69MW1310-	10/29/99	E310.1	N1	ALKALINITY, TOTAL (AS CaCO3)	WG	235	19.2	2.2	10	mg/L		OT-E722403
69MW1310	69MW1310-	10/29/99	MCTNP	N1	NITROGEN	WG	235	322	8.7	30	µg/L		OT-E722501
69MW1310	69MW1310-	10/29/99	MCTNP	N1	PHOSPHORUS, TOTAL (AS P)	WG	235	45.2	1.5	3	µg/L		OT-E722501
69MW1310	69MW1310-	10/29/99	E415.1	N1	DISSOLVED ORGANIC CARBON	WG	235	1.87	0.11	1	mg/L		OT-E722402
69MW1310	69MW1310-	10/29/99	E415.1	N1	TOTAL ORGANIC CARBON	WG	235	0.355	0.11	1	mg/L	J	OT-E722401
69MW1310	69MW1310-	11/30/99	A4500B	N1	NITROGEN, NITRITE	WG	235	ND	1.8	7.8	µg/L	U	OT-E732101
69MW1310	69MW1310-	11/30/99	A4500E	N1	PHOSPHORUS, TOTAL PO4 (AS P)	WG	235	42.6	0.6	2	µg/L		OT-E732101
69MW1310	69MW1310-	11/30/99	A4500F	N1	NITROGEN, NITRATE (AS N)	WG	235	274	0.9	3	µg/L		OT-E732101
69MW1310	69MW1310-	11/30/99	A4500H	N1	NITROGEN, AMMONIA (AS N)	WG	235	ND	5	10	µg/L	U	OT-E732101
69MW1310	69MW1310-	11/30/99	E310.1	N1	ALKALINITY, TOTAL (AS CaCO3)	WG	235	ND	15	15.2	mg/L	U	OT-E732703
69MW1310	69MW1310-	11/30/99	MCTNP	N1	NITROGEN	WG	235	327	8.7	30	µg/L		OT-E732101
69MW1310	69MW1310-	11/30/99	MCTNP	N1	PHOSPHORUS, TOTAL (AS P)	WG	235	43.4	1.5	3	µg/L		OT-E732101
69MW1310	69MW1310-	11/30/99	E415.1	N1	DISSOLVED ORGANIC CARBON	WG	235	0.417	0.11	1	mg/L	J	OT-E732702
69MW1310	69MW1310-	11/30/99	E415.1	N1	TOTAL ORGANIC CARBON	WG	235	1.38	0.11	1	mg/L		OT-E732701
69MW1310	69MW1310-	01/04/00	A4500B	N1	NITROGEN, NITRITE	WG	235	0.5	0.2	3	µg/L	J	OT-E734401
69MW1310	69MW1310-FD	01/04/00	A4500B	FD1	NITROGEN, NITRITE	WG	235	0.4	0.2	3	µg/L	J	OT-E734402
69MW1310	69MW1310-	01/04/00	A4500E	N1	PHOSPHORUS, TOTAL PO4 (AS P)	WG	235	39.5	0.6	2	µg/L		OT-E734401
69MW1310	69MW1310-FD	01/04/00	A4500E	FD1	PHOSPHORUS, TOTAL PO4 (AS P)	WG	235	39.2	0.6	2	µg/L		OT-E734402
69MW1310	69MW1310-	01/04/00	A4500F	N1	NITROGEN, NITRATE (AS N)	WG	235	294	0.9	3	µg/L		OT-E734401
69MW1310	69MW1310-FD	01/04/00	A4500F	FD1	NITROGEN, NITRATE (AS N)	WG	235	294	0.9	3	µg/L		OT-E734402

**Appendix B**  
**Analytical Laboratory Data**  
**June 1999 - January 2000**

Location	Sample ID	Date	Method	Type	Analyte	Matrix	Depth	Result	DL	RL	Units	Qual	Control No.
69MW1310	69MW1310-	01/04/00	A4500H	N1	NITROGEN, AMMONIA (AS N)	WG	235	ND	5	10	µg/L	U	OT-E734401
69MW1310	69MW1310-FD	01/04/00	A4500H	FD1	NITROGEN, AMMONIA (AS N)	WG	235	ND	5	10	µg/L	U	OT-E734402
69MW1310	69MW1310-	01/04/00	E310.1	N1	ALKALINITY, TOTAL (AS CaCO3)	WG	235	18.3	2.2	5	mg/L		OT-E734303
69MW1310	69MW1310-FD	01/04/00	E310.1	FD1	ALKALINITY, TOTAL (AS CaCO3)	WG	235	17.7	2.2	5	mg/L		OT-E734306
69MW1310	69MW1310-	01/04/00	MCTNP	N1	NITROGEN	WG	235	295	8.7	30	µg/L		OT-E734401
69MW1310	69MW1310-FD	01/04/00	MCTNP	FD1	NITROGEN	WG	235	302	8.7	30	µg/L		OT-E734402
69MW1310	69MW1310-	01/04/00	MCTNP	N1	PHOSPHORUS, TOTAL (AS P)	WG	235	41.6	1.5	3	µg/L		OT-E734401
69MW1310	69MW1310-FD	01/04/00	MCTNP	FD1	PHOSPHORUS, TOTAL (AS P)	WG	235	41.6	1.5	3	µg/L		OT-E734402
69MW1310	69MW1310-	01/04/00	E415.1	N1	DISSOLVED ORGANIC CARBON	WG	235	ND	0.11	1	mg/L	U	OT-E734301
69MW1310	69MW1310-FD	01/04/00	E415.1	FD1	DISSOLVED ORGANIC CARBON	WG	235	1.7	0.11	1	mg/L		OT-E734304
69MW1310	69MW1310-	01/04/00	E415.1	N1	TOTAL ORGANIC CARBON	WG	235	ND	0.11	1	mg/L	U	OT-E734302
69MW1310	69MW1310-FD	01/04/00	E415.1	FD1	TOTAL ORGANIC CARBON	WG	235	ND	0.11	1	mg/L	U	OT-E734305
69SW0006	69SW0006-72	08/11/99	A4500B	N1	NITROGEN, NITRITE	WS	0	6.3	0.2	3	µg/L		OT-E689902
69SW0006	69SW0006-72	08/11/99	A4500E	N1	PHOSPHORUS, TOTAL PO4 (AS P)	WS	0	96.8	0.6	2	µg/L		OT-E689902
69SW0006	69SW0006-72	08/11/99	A4500F	N1	NITROGEN, NITRATE (AS N)	WS	0	38.7	0.9	3	µg/L		OT-E689902
69SW0006	69SW0006-72	08/11/99	A4500H	N1	NITROGEN, AMMONIA (AS N)	WS	0	1600	5	10	µg/L		OT-E689902
69SW0006	69SW0006-73	08/11/99	E310.1	N1	ALKALINITY, TOTAL (AS CaCO3)	WS	0	ND	1.76	12.8	mg/L	U	OT-E690001
69SW0006	69SW0006-72	08/11/99	MCTNP	N1	NITROGEN	WS	0	2250	87	300	µg/L		OT-E689902
69SW0006	69SW0006-72	08/11/99	MCTNP	N1	PHOSPHORUS, TOTAL (AS P)	WS	0	141	1.5	3	µg/L		OT-E689902
69SW0006	69SW0006-72	08/11/99	A10200H	N1	CHLOROPHYLL A	WS	0	2.1	0.012	0.1	G/L		OT-E689901
69SW0006	69SW0006-73	08/11/99	E415.1	N1	TOTAL ORGANIC CARBON	WS	0	6.27	0.11	1	mg/L		OT-E690002
69SW0006	69SW0006-77FD	11/15/99	A4500B	FD1	NITROGEN, NITRITE	WS	0	10.8	0.2	3	µg/L		OT-E720504
69SW0006	69SW0006-77	11/15/99	A4500B	N1	NITROGEN, NITRITE	WS	0	13.1	0.2	3	µg/L		OT-E720502
69SW0006	69SW0006-77FD	11/15/99	A4500E	FD1	PHOSPHORUS, TOTAL PO4 (AS P)	WS	0	235	2.4	8	µg/L		OT-E720504
69SW0006	69SW0006-77	11/15/99	A4500E	N1	PHOSPHORUS, TOTAL PO4 (AS P)	WS	0	229	2.4	8	µg/L		OT-E720502
69SW0006	69SW0006-77FD	11/15/99	A4500F	FD1	NITROGEN, NITRATE (AS N)	WS	0	53.3	0.9	3	µg/L		OT-E720504
69SW0006	69SW0006-77	11/15/99	A4500F	N1	NITROGEN, NITRATE (AS N)	WS	0	52	0.9	3	µg/L		OT-E720502
69SW0006	69SW0006-77FD	11/15/99	A4500H	FD1	NITROGEN, AMMONIA (AS N)	WS	0	43.8	5	10	µg/L		OT-E720504
69SW0006	69SW0006-77	11/15/99	A4500H	N1	NITROGEN, AMMONIA (AS N)	WS	0	47.3	5	10	µg/L		OT-E720502
69SW0006	69SW0006-77	11/15/99	E310.1	N1	ALKALINITY, TOTAL (AS CaCO3)	WS	0	15	2.2	10	mg/L		OT-E720401
69SW0006	69SW0006-77FD	11/15/99	E310.1	FD1	ALKALINITY, TOTAL (AS CaCO3)	WS	0	14.9	2.2	10	mg/L		OT-E720403
69SW0006	69SW0006-77FD	11/15/99	MCTNP	FD1	NITROGEN	WS	0	719	8.7	30	µg/L		OT-E720504
69SW0006	69SW0006-77	11/15/99	MCTNP	N1	NITROGEN	WS	0	726	8.7	30	µg/L		OT-E720502
69SW0006	69SW0006-77FD	11/15/99	MCTNP	FD1	PHOSPHORUS, TOTAL (AS P)	WS	0	305	15	30	µg/L		OT-E720504
69SW0006	69SW0006-77	11/15/99	MCTNP	N1	PHOSPHORUS, TOTAL (AS P)	WS	0	309	15	30	µg/L		OT-E720502
69SW0006	69SW0006-77	11/15/99	A10200H	N1	CHLOROPHYLL A	WS	0	0.8	0.012	0.1	µg/L	J	OT-E720501
69SW0006	69SW0006-77FD	11/15/99	A10200H	FD1	CHLOROPHYLL A	WS	0	0.4	0.012	0.1	µg/L	J	OT-E720503
69SW0006	69SW0006-77	11/15/99	E415.1	N1	TOTAL ORGANIC CARBON	WS	0	14.6	0.11	1	mg/L		OT-E720402
69SW0006	69SW0006-77FD	11/15/99	E415.1	FD1	TOTAL ORGANIC CARBON	WS	0	14.4	0.11	1	mg/L		OT-E720404
69SW0065	69SW0065-25	08/11/99	A4500B	N1	NITROGEN, NITRITE	WS	0	ND	0.4	3	µg/L	U	OT-E692102
69SW0065	69SW0065-25	08/11/99	A4500E	N1	PHOSPHORUS, TOTAL PO4 (AS P)	WS	0	27.3	0.6	2	µg/L		OT-E692102

**Appendix B**  
**Analytical Laboratory Data**  
**June 1999 - January 2000**

Location	Sample ID	Date	Method	Type	Analyte	Matrix	Depth	Result	DL	RL	Units	Qual	Control No.
69SW0065	69SW0065-25	08/11/99	A4500F	N1	NITROGEN, NITRATE (AS N)	WS	0	318	0.9	3	µg/L		OT-E692102
69SW0065	69SW0065-25	08/11/99	A4500H	N1	NITROGEN, AMMONIA (AS N)	WS	0	ND	5	10	µg/L	U	OT-E692102
69SW0065	69SW0065-26	08/11/99	E310.1	N1	ALKALINITY, TOTAL (AS CaCO <sub>3</sub> )	WS	0	ND	1.28	12.8	mg/L	U	OT-E692201
69SW0065	69SW0065-25	08/11/99	MCTNP	N1	NITROGEN	WS	0	217	8.7	30	µg/L		OT-E692102
69SW0065	69SW0065-25	08/11/99	MCTNP	N1	PHOSPHORUS, TOTAL (AS P)	WS	0	28.9	1.5	3	µg/L		OT-E692102
69SW0065	69SW0065-25	08/11/99	A10200H	N1	CHLOROPHYLL A	WS	0	ND	0.012	0.1	G/L	U	OT-E692101
69SW0065	69SW0065-26	08/11/99	E415.1	N1	TOTAL ORGANIC CARBON	WS	0	ND	0.902	1.43	mg/L	U	OT-E692202
69SW0065	69SW0065-27	11/15/99	A4500B	N1	NITROGEN, NITRITE	WS	0	0.7	0.2	3	µg/L	J	OT-E720702
69SW0065	69SW0065-27	11/15/99	A4500E	N1	PHOSPHORUS, TOTAL PO <sub>4</sub> (AS P)	WS	0	ND	0.6	2	µg/L	U	OT-E720702
69SW0065	69SW0065-27	11/15/99	A4500F	N1	NITROGEN, NITRATE (AS N)	WS	0	277	0.9	3	µg/L		OT-E720702
69SW0065	69SW0065-27	11/15/99	A4500H	N1	NITROGEN, AMMONIA (AS N)	WS	0	ND	5	10	µg/L	U	OT-E720702
69SW0065	69SW0065-27	11/15/99	E310.1	N1	ALKALINITY, TOTAL (AS CaCO <sub>3</sub> )	WS	0	15	2.2	10	mg/L		OT-E720601
69SW0065	69SW0065-27	11/15/99	MCTNP	N1	NITROGEN	WS	0	288	8.7	30	µg/L		OT-E720702
69SW0065	69SW0065-27	11/15/99	MCTNP	N1	PHOSPHORUS, TOTAL (AS P)	WS	0	28.8	1.5	3	µg/L		OT-E720702
69SW0065	69SW0065-27	11/15/99	A10200H	N1	CHLOROPHYLL A	WS	0	ND	0.012	0.1	µg/L	U	OT-E720701
69SW0065	69SW0065-27	11/15/99	E415.1	N1	TOTAL ORGANIC CARBON	WS	0	ND	0.487	1	mg/L	U	OT-E720602

DL = detection limit

FD1 = field duplicate

J = estimated

mg/L = milligrams per liter

ND = nondetect

N1 = native sample

Qual = qualifier

RL = reporting limit

U = nondetect

WG = groundwater

WS = surface water

µg/L = micrograms per liter

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## **APPENDIX C**

### **Preliminary Screening-Level Human Health Risk Evaluation for FS-28 Surface Water**

## APPENDIX C

### PRELIMINARY SCREENING-LEVEL HUMAN HEALTH RISK EVALUATION FOR FS-28 SURFACE WATER

A screening-level human health risk evaluation was conducted to examine the potential for imminent human health risks from exposure to chemical contaminants detected in surface water samples collected from treatment plant effluent and the Coonamessett River. The data represent contaminant levels in the surface water systems; therefore, it is important to examine the potential for adverse risks to human health.

#### **Technical Approach**

Human health is evaluated in terms of imminent risk, that is, an excess individual cancer risk of  $1 \times 10^{-3}$  for carcinogenic compounds and a hazard quotient of 10 for noncarcinogenic compounds. The approach used is consistent with the guidance provided in the Massachusetts Military Reservation (MMR) *Risk Assessment Handbook* (ASG 1994) and follows standard protocols established by the U.S. Environmental Protection Agency (EPA). Current toxicity data were obtained from the EPA Integrated Risk Information System (IRIS). Risk-based concentrations (RBCs) and hazard-based concentrations (HBCs) were developed for surface water.

The risk equations provided in the MMR *Risk Assessment Handbook* were modified to evaluate exposure from recreational use of surface water bodies, including dermal contact with surface water and sediment, incidental ingestion of surface water and sediment, and the consumption of fish in surface water bodies (Table C-1). Exposure factors provided in the MMR *Risk Assessment Handbook* were used and represent exposure values agreed to by both the Massachusetts Department of Environmental Protection (DEP) and EPA. The specific exposure factors are provided in Table C-2. Toxicity and bioaccumulation factors used to calculate RBCs and HBCs are presented in Table C-3 and Table C-4, respectively.

As a screening tool, this approach uses extremely conservative risk and hazard equations and exposure factors. The results should be viewed in the following manner:

- If the concentrations of chemical constituents in surface water and sediment are less than the calculated RBCs or HBCs, it is appropriate to report that there is no imminent risk associated with the detected chemicals.
- If the concentrations of chemical constituents in surface water and sediment are greater than the calculated RBCs or HBCs, it does not mean there is a definitive risk to human health. It does mean that these compounds need to be evaluated further using more realistic maximum exposure scenarios or a more sophisticated approach that reflects site-specific uses (i.e., exposure) and specific modes of uptake associated with the compounds of concern. If further evaluation is warranted, it would be conducted by either the Air Force Center for Environmental Excellence (AFCEE) or the Commonwealth of Massachusetts, specifically DEP or the Department of Public Health. Any further evaluations conducted by AFCEE would be conducted with the support of EPA and DEP.

### **Results of Screening-Level Human Health Risk Evaluation**

Metals were detected in surface water treatment plant effluent at FS-28. One organic compound, ethylene dibromide (EDB), was detected in surface water collected from the Coonamessett River.

Chemical concentrations detected in surface water are compared to RBCs and HBCs developed for each compound (Table C-5). Toxicity values are unavailable for several metals. Therefore, RBCs and HBCs could not be calculated for several metals.

Although several metals were detected in treatment plant effluent, none of the compounds exceeded risk or hazard-based concentrations. EDB was detected in surface water collected from the Coonamessett River; however, the maximum concentration did not exceed the calculated risk-based concentration.

## Reference

ASG (Automated Sciences Group). 1994 (September). *Final Risk Assessment Handbook. Massachusetts Military Reservation. Cape Cod, Massachusetts.* Prepared for Air National Guard Bureau, Massachusetts Military Reservation, Cape Cod, Massachusetts.

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**Table C-1**  
**Calculations for Deriving Risk- and Hazard-Based Concentrations**

Equations for Deriving Risk-Equivalent Surface Water and Sediment Concentrations	
<u>Surface Water</u>	
$RBC = (\text{Target Risk} \times BW \times AT_{CG}) / [SF_o \times EF_{SWIM} \times ET_{SWIM} \times ED \times (IR_{SW} + SA_{BOD} \times PC \times CF_{VOL}) + (IR_{FISH} \times BAF \times FI \times EF_{FISH} \times 1/EF_{SWIM} \times 1/ET_{SWIM})]$	
<u>Sediment</u>	
$RBC = (\text{Target Risk} \times BW \times AT_{CG}) / [SF_o \times EF_{SWIM} \times ED \times CF_{WT} \times (IR_{SED} + SA_{LEG} \times AF \times ABS)]$	

Equations for Deriving Hazard-Equivalent Surface Water and Sediment Concentrations	
<u>Surface Water</u>	
$HBC = (\text{Target Hazard Quotient} \times BW \times AT_{NONCG}) / [1/RfD_o \times EF_{SWIM} \times ET_{SWIM} \times ED \times (IR_{SW} + SA_{BOD} \times PC \times CF_{VOL}) + (IR_{FISH} \times BAF \times FI \times EF_{FISH} \times 1/EF_{SWIM} \times 1/ET_{SWIM})]$	
<u>Sediment</u>	
$HBC = (\text{Target Hazard Quotient} \times BW \times AT_{NONCG}) / [1/RfD_o \times EF_{SWIM} \times ED \times CF_{WT} \times (IR_{SED} + SA_{LEG} \times AF \times ABS)]$	

RBC = risk-based concentration

HBC = hazard-based concentration

See Table C-2 for definitions of other parameters and exposure factors.

**Table C-2**  
**Definition of Parameters and Exposure Factors**

Parameter	Definition	Adult	Child (age 1-6)
Target Risk	Target excess individual lifetime cancer risk	$1 \times 10^{-3}$	$1 \times 10^{-3}$
Target Hazard Quotient	Target hazard quotient for noncancer risk	10	10
BW (kg)	Body weight	70.00	16.00
AT <sub>cg</sub> (days)	Averaging time for carcinogens	25550.00	25550.00
AT <sub>noncg</sub> (days)	Averaging time for noncarcinogens (ED x 365)	8760.00	2190.00
IR <sub>SW</sub> (L/hr)	Ingestion rate for surface water	0.05	0.05
IR <sub>SED</sub> (mg/day)	Ingestion rate for sediment	100.00	100.00
IR <sub>FISH</sub> (kg/meal)	Ingestion rate for fish consumption	0.284	0.284
ET <sub>SWIM</sub> (hr/day or /event)	Swimming exposure time	2.60	2.60
EF <sub>SWIM</sub> (days/yr)	Swimming exposure frequency	7.00	7.00
EF <sub>FISH</sub> (meals/yr)	Fish exposure frequency	104.00	104.00
ED (yr)	Exposure duration	24.00	6.00
FI	Fraction of fish ingested from contaminated sources	1.00	1.00
SA <sub>BOD</sub> (cm <sup>2</sup> )	Surface area of body	19400.00	7280.00
SA <sub>LEG</sub> (cm <sup>2</sup> )	Surface area of legs	5500.00	1800.00
CF <sub>WT</sub> (mg/kg)	Conversion factor for weight	1.00E-06	1.00E-06
CF <sub>VOL</sub> (L/cm <sup>3</sup> )	Volumetric conversion for water	1.00E-03	1.00E-03
RfD <sub>o</sub> (mg/kg-day) <sup>-1</sup>	Reference dose	Chemical specific	Chemical specific
Sf <sub>o</sub> (mg/kg-day) <sup>-1</sup>	Oral slope factor	Chemical specific	Chemical specific
PC (cm/hr)	Dermal permeability constant	Chemical specific	Chemical specific
AF (mg/cm <sup>2</sup> -hr or -event)	Skin adherence factor	1.00	1.00
ABS (unitless)	Dermal absorption factor	Chemical specific	Chemical specific
BAF (unitless)	Bioaccumulation factor for fish	Chemical specific	Chemical specific

cm = centimeters

cm<sup>2</sup> = square centimeters

cm<sup>3</sup> = cubic centimeters

hr = hour

kg = kilograms

L = liter

mg = milligrams

yr = year

**Table C-3**  
**Slope Factors and Reference Doses**

Analyte	Sf <sub>o</sub> (mg/kg-day) <sup>-1</sup>	Reference	RfD <sub>o</sub> (mg/kg-day) <sup>-1</sup>	Reference
<b>METALS</b>				
ANTIMONY	NA		4.0E-04	a
BARIUM	NA		7.0E-02	a
CALCIUM	NA		NA	
COPPER	NA		NA	
IRON	NA		NA	
LEAD	NA		NA	
MAGNESIUM	NA		NA	
MANGANESE, non-dietary (water, soil)	NA		4.7E-02	a
POTASSIUM	NA		NA	
SODIUM	NA		NA	
ZINC	NA		3.0E-01	a
1,2-DIBROMOETHANE (ETHYLENE DIBROMIDE)	8.5E+01	a	NA	

mg/kg-day = milligrams per kilogram per day

NA = not available

RfD<sub>o</sub> = oral reference dose

Sf<sub>o</sub> = oral slope factor

a = U.S. Environmental Protection Agency, 1999, Integrated Risk Information System (IRIS).

**Table C-4**  
**Fish Bioaccumulation Factors (BAFs)**

Chemical	BAF	Reference
ANTIMONY	9.00E-01	ASG, 1994
BARIUM	4	a
CALCIUM	NA	
COPPER	36	c
IRON	100	a
LEAD	49	c
MAGNESIUM	NA	
MANGANESE	400	b
POTASSIUM	NA	
SODIUM	NA	
ZINC	47	c
1,2-Dibromoethane (EDB)	10	d

**KEY TO REFERENCES:**

- a Automated Sciences Group (ASG). 1994. *Final Risk Assessment Handbook*. Massachusetts Military Reservation. Cape Cod, Massachusetts. Prepared for Air National Guard Bureau, Massachusetts Military Reservation, Cape Cod, Massachusetts.
- b Barnhouse, L.W., J. E. Breck, T. D. Jones, G.W. Suter, C. Easterly, L. R. Glass, B.A. Owen, and A.P. Watson. 1998. *Relative Toxicity Estimates and Bioaccumulation Factors for the Defense Priority Model*. ORNL-6416. Oak Ridge National Laboratory, Oak Ridge, TN.
- c EPA Region IV. 1996. *Toxic Substance Spreadsheet*. EPA Region IV, Atlanta, GA.
- d AFCEE (Air Force Center for Environmental Excellence) 1998. *Draft Final Ethylene Dibromide Derivation of Aquatic Screening Benchmarks*. Prepared by S. Talmadge, Life Science Division, Oak Ridge National Laboratory, Oak Ridge, TN.

NA = Bioaccumulation factor not available.

**Table C-5**  
**Comparison of Surface Water Concentrations with Risk- and Hazard-Based Concentrations**

Location	Analyte	Cumulative Risk-Based Concentration (RBC) at Target Risk of $1 \times 10^{-3}$	Cumulative Hazard-Based Concentration (HBC) at Target Hazard of 10.0	Minimum Detect	Maximum Detect
All units µg/L					
FS-28 Treatment Plant	ANTIMONY	NA	4.52E+03	2.6	2.6
	BARIUM (TOTAL)	NA	1.84E+05	3	8.4
	CALCIUM (TOTAL)	NA	NA	2920	3540
	COPPER (TOTAL)	NA	NA	0.93	0.93
	IRON (TOTAL)	NA	NA	98.1	110
	LEAD (TOTAL)	NA	NA	0.001	0.001
	MAGNESIUM (TOTAL)	NA	NA	1440	1670
	MANGANESE (TOTAL)	NA	3.26E+03	3.9	21.5
	POTASSIUM (TOTAL)	NA	NA	784	1140
	SODIUM (TOTAL)	NA	NA	7320	8510
	ZINC (TOTAL)	NA	6.78E+04	37.6	154
Coonamessett River	1,2-DIBROMOETHANE (EDB)	5.66E+00	NA	0.006	J 0.051

J = The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte in the sample.

NA = Slope factors or reference doses were not available for calculation of RBCs and/or HBCs.

µg/L = micrograms per liter

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## **APPENDIX D**

### **Treatment Plant Monitoring Data**

**Appendix D**  
**Treatment Plant Monitoring Data January - December 1999**

Location	Sample ID	Control Number	Date	Method	Analyte	Matrix	Type	Result	DL	RL	Units	Qual
69PLT01001	69PLT01001-50	OT-D657301	1/4/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	0.972	0.05	0.1	µg/L	
69PLT01001	69PLT01001-52	OT-D658201	2/1/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	0.594	0.025	0.05	µg/L	
69PLT01001	69PLT01001-53	MM-P000101	3/2/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	0.638	0.025	0.05	µg/L	
69PLT01001	69PLT01001-54	MM-P000301	4/1/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	0.668	0.025	0.05	µg/L	
69PLT01001	69PLT01001-55	MM-L002001	4/6/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	1.89	0.05	0.1	µg/L	
69PLT01001	69PLT01001-56	MM-L002301	4/7/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	1.68	0.05	0.1	µg/L	
69PLT01001	69PLT01001-57	MM-L002401	4/9/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	1.67	0.05	0.1	µg/L	
69PLT01001	69PLT01001-58	MM-L002501	4/11/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	1.4	0.005	0.01	µg/L	
69PLT01001	69PLT01001-59	MM-L003401	4/14/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	1.24	0.05	0.1	µg/L	
69PLT01001	69PLT01001-60	MM-L003501	4/16/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	0.828	0.05	0.1	µg/L	
69PLT01001	69PLT01001-62	MM-L003701	4/18/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	1.15	0.05	0.1	µg/L	
69PLT01001	69PLT01001-65	MM-L004301	4/23/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	1.15	0.025	0.05	µg/L	
69PLT01001	69PLT01001-66	MM-L004701	4/25/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	0.996	0.05	0.1	µg/L	
69PLT01001	69PLT01001-67	MM-L004901	4/27/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	1.04	0.05	0.1	µg/L	
69PLT01001	69PLT01001-68	MM-L005101	4/29/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	0.861	0.025	0.05	µg/L	
69PLT01001	69PLT01001-69	MM-P000701	5/4/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	0.925	0.05	0.1	µg/L	
69PLT01001	69PLT01001-70	MM-L005501	5/7/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	0.833	0.05	0.1	µg/L	
69PLT01001	69PLT01001-71	MM-L005701	5/14/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	0.711	0.05	0.1	µg/L	
69PLT01001	69PLT01001-72	MM-L005901	5/21/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	0.949	0.025	0.05	µg/L	
69PLT01001	69PLT01001-73	MM-L006701	6/2/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	0.995	0.025	0.05	µg/L	
69PLT01001	69PLT01001-74	MM-L008101	7/6/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	0.606	0.025	0.05	µg/L	
69PLT01001	69PLT01001-85	MM-L011201	8/3/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	0.615	0.025	0.05	µg/L	
69PLT01001	69PLT01001-87	MM-L011401	8/9/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	0.869	0.025	0.05	µg/L	
69PLT01001	69PLT01001-86	MM-L012101	8/12/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	0.729	0.025	0.05	µg/L	
69PLT01001	69PLT01001-87	MM-L012401	8/14/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	0.559	0.025	0.05	µg/L	
69PLT01001	69PLT01001-88	MM-L012501	8/16/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	0.58	0.025	0.05	µg/L	
69PLT01001	69PLT01001-85	MM-L012601	8/17/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	0.616	0.025	0.05	µg/L	J
69PLT01001	69PLT01001-90	MM-L012801	8/19/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	0.512	0.025	0.05	µg/L	
69PLT01001	69PLT01001-92	MM-L012901	8/23/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	0.74	0.025	0.05	µg/L	J
69PLT01001	69PLT01001-93	MM-L019201	9/7/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	0.668	0.025	0.05	µg/L	
69PLT01001	69PLT01001-95	MM-L020401	10/1/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	0.574	0.025	0.05	µg/L	
69PLT01001	69PLT01001-95	MM-L010101	10/29/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	0.675	0.025	0.05	µg/L	
69PLT01001	69PLT01001-	MM-L010901	11/30/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	0.649	0.025	0.05	µg/L	
69PLT01001	69PLT01001-51	OT-D657402	1/4/99	E160.1	TOTAL DISSOLVED SOLIDS	WW	N1	64	4.4	10	mg/L	
69PLT01001	69PLT01001-54	MM-P000401	4/1/99	E160.1	TOTAL DISSOLVED SOLIDS	WW	N1	46	4.4	10	mg/L	
69PLT01001	69PLT01001-69	MM-P000803	5/4/99	E160.1	TOTAL DISSOLVED SOLIDS	WW	N1	49	4.4	10	mg/L	
69PLT01001	69PLT01001-74	MM-L008201	7/6/99	E160.1	TOTAL DISSOLVED SOLIDS	WW	N1	36	3.9	10	mg/L	
69PLT01001	69PLT01001-95	MM-L020601	10/1/99	E160.1	TOTAL DISSOLVED SOLIDS	WW	N1	43	3.9	10	mg/L	
69PLT01001	69PLT01001-51	OT-D657402	1/4/99	E160.2	SUSPENDED SOLIDS (RESIDUE, NON-FILT	WW	N1	ND	3.6	4	mg/L	U
69PLT01001	69PLT01001-54	MM-P000401	4/1/99	E160.2	SUSPENDED SOLIDS (RESIDUE, NON-FILT	WW	N1	ND	3.6	4	mg/L	U

**Appendix D**  
**Treatment Plant Monitoring Data January - December 1999**

Location	Sample ID	Control Number	Date	Method	Analyte	Matrix	Type	Result	DL	RL	Units	Qual
69PLT01001	69PLT01001-69	MM-P000803	5/4/99	E160.2	SUSPENDED SOLIDS (RESIDUE, NON-FILT	WW	N1	ND	3.6	4	mg/L	U
69PLT01001	69PLT01001-74	MM-L008201	7/6/99	E160.2	SUSPENDED SOLIDS (RESIDUE, NON-FILT	WW	N1	9	3.6	4	mg/L	
69PLT01001	69PLT01001-95	MM-L020601	10/1/99	E160.2	SUSPENDED SOLIDS (RESIDUE, NON-FILT	WW	N1	ND	3.6	4	mg/L	U
69PLT01001	69PLT01001-51	OT-D657402	1/4/99	E300	BROMIDE	WW	N1	0.036	0.013	0.1	mg/L	J
69PLT01001	69PLT01001-54	MM-P000401	4/1/99	E300	BROMIDE	WW	N1	ND	0.013	0.1	mg/L	U
69PLT01001	69PLT01001-55	MM-L002101	4/6/99	E300	BROMIDE	WW	N1	0.013	0.013	0.1	mg/L	J
69PLT01001	69PLT01001-65	MM-L004403	4/23/99	E300	BROMIDE	WW	N1	ND	0.013	0.1	mg/L	U
69PLT01001	69PLT01001-69	MM-P000803	5/4/99	E300	BROMIDE	WW	N1	0.04	0.013	0.1	mg/L	J
69PLT01001	69PLT01001-74	MM-L008201	7/6/99	E300	BROMIDE	WW	N1	ND	0.013	0.1	mg/L	U
69PLT01001	69PLT01001-85	MM-L011301	8/3/99	E300	BROMIDE	WW	N1	ND	0.013	0.1	mg/L	U
69PLT01001	69PLT01001-94	MM-L019301	9/7/99	E300	BROMIDE	WW	N1	ND	0.013	0.1	mg/L	U
69PLT01001	69PLT01001-95	MM-L020601	10/1/99	E300	BROMIDE	WW	N1	ND	0.013	0.1	mg/L	U
69PLT01001	69PLT01001-95	MM-L101201	10/29/99	E300	BROMIDE	WW	N1	0.02	0.013	0.1	mg/L	J
69PLT01001	69PLT01001-	MM-L102001	11/30/99	E300	BROMIDE	WW	N1	ND	0.013	0.1	mg/L	U
69PLT01001	69PLT01001-51	OT-D657402	1/4/99	E300	CHLORIDE (AS CL)	WW	N1	24.5	0.055	0.2	mg/L	
69PLT01001	69PLT01001-54	MM-P000401	4/1/99	E300	CHLORIDE (AS CL)	WW	N1	11.8	0.055	0.2	mg/L	
69PLT01001	69PLT01001-55	MM-L002101	4/6/99	E300	CHLORIDE (AS CL)	WW	N1	8.9	0.055	0.2	mg/L	
69PLT01001	69PLT01001-65	MM-L004403	4/23/99	E300	CHLORIDE (AS CL)	WW	N1	10.2	0.055	0.2	mg/L	
69PLT01001	69PLT01001-69	MM-P000803	5/4/99	E300	CHLORIDE (AS CL)	WW	N1	10	0.055	0.2	mg/L	
69PLT01001	69PLT01001-74	MM-L008201	7/6/99	E300	CHLORIDE (AS CL)	WW	N1	10.5	0.056	0.2	mg/L	
69PLT01001	69PLT01001-85	MM-L011301	8/3/99	E300	CHLORIDE (AS CL)	WW	N1	10.8	0.056	0.2	mg/L	
69PLT01001	69PLT01001-94	MM-L019301	9/7/99	E300	CHLORIDE (AS CL)	WW	N1	10.8	0.056	0.2	mg/L	
69PLT01001	69PLT01001-95	MM-L020601	10/1/99	E300	CHLORIDE (AS CL)	WW	N1	9.6	0.056	0.2	mg/L	
69PLT01001	69PLT01001-95	MM-L101201	10/29/99	E300	CHLORIDE (AS CL)	WW	N1	9.6	0.056	0.2	mg/L	
69PLT01001	69PLT01001-	MM-L102001	11/30/99	E300	CHLORIDE (AS CL)	WW	N1	10.5	0.056	0.2	mg/L	
69PLT01001	69PLT01001-51	OT-D657402	1/4/99	E300	NITROGEN, NITRATE (AS N)	WW	N1	1.4	0.005	0.1	mg/L	
69PLT01001	69PLT01001-54	MM-P000401	4/1/99	E300	NITROGEN, NITRATE (AS N)	WW	N1	0.17	0.005	0.1	mg/L	
69PLT01001	69PLT01001-55	MM-L002101	4/6/99	E300	NITROGEN, NITRATE (AS N)	WW	N1	0.3	0.005	0.1	mg/L	
69PLT01001	69PLT01001-65	MM-L004403	4/23/99	E300	NITROGEN, NITRATE (AS N)	WW	N1	0.15	0.005	0.1	mg/L	
69PLT01001	69PLT01001-69	MM-P000803	5/4/99	E300	NITROGEN, NITRATE (AS N)	WW	N1	0.17	0.005	0.1	mg/L	
69PLT01001	69PLT01001-74	MM-L008201	7/6/99	E300	NITROGEN, NITRATE (AS N)	WW	N1	0.2	0.0061	0.1	mg/L	
69PLT01001	69PLT01001-85	MM-L011301	8/3/99	E300	NITROGEN, NITRATE (AS N)	WW	N1	0.23	0.0061	0.1	mg/L	
69PLT01001	69PLT01001-94	MM-L019301	9/7/99	E300	NITROGEN, NITRATE (AS N)	WW	N1	0.24	0.0061	0.1	mg/L	
69PLT01001	69PLT01001-95	MM-L020601	10/1/99	E300	NITROGEN, NITRATE (AS N)	WW	N1	0.18	0.0061	0.1	mg/L	
69PLT01001	69PLT01001-95	MM-L101201	10/29/99	E300	NITROGEN, NITRATE (AS N)	WW	N1	0.23	0.0061	0.1	mg/L	
69PLT01001	69PLT01001-	MM-L102001	11/30/99	E300	NITROGEN, NITRATE (AS N)	WW	N1	0.23	0.0061	0.1	mg/L	
69PLT01001	69PLT01001-51	OT-D657402	1/4/99	E300	NITROGEN, NITRITE	WW	N1	ND	0.012	0.4	mg/L	U
69PLT01001	69PLT01001-54	MM-P000401	4/1/99	E300	NITROGEN, NITRITE	WW	N1	ND	0.012	0.4	mg/L	U
69PLT01001	69PLT01001-55	MM-L002101	4/6/99	E300	NITROGEN, NITRITE	WW	N1	ND	0.012	0.4	mg/L	U
69PLT01001	69PLT01001-65	MM-L004403	4/23/99	E300	NITROGEN, NITRITE	WW	N1	ND	0.012	0.4	mg/L	U

**Appendix D**  
**Treatment Plant Monitoring Data January - December 1999**

Location	Sample ID	Control Number	Date	Method	Analyte	Matrix	Type	Result	DL	RL	Units	Qual
69PLT01001	69PLT01001-69	MM-P000803	5/4/99	E300	NITROGEN, NITRITE	WW	N1	ND	0.012	0.4	mg/L	U
69PLT01001	69PLT01001-74	MM-L008201	7/6/99	E300	NITROGEN, NITRITE	WW	N1	ND	0.0091	0.4	mg/L	U
69PLT01001	69PLT01001-85	MM-L011301	8/3/99	E300	NITROGEN, NITRITE	WW	N1	ND	0.0091	0.4	mg/L	U
69PLT01001	69PLT01001-94	MM-L019301	9/7/99	E300	NITROGEN, NITRITE	WW	N1	ND	0.0091	0.4	mg/L	U
69PLT01001	69PLT01001-95	MM-L020601	10/1/99	E300	NITROGEN, NITRITE	WW	N1	ND	0.0091	0.4	mg/L	U
69PLT01001	69PLT01001-95	MM-L101201	10/29/99	E300	NITROGEN, NITRITE	WW	N1	ND	0.0091	0.4	mg/L	U
69PLT01001	69PLT01001-	MM-L102001	11/30/99	E300	NITROGEN, NITRITE	WW	N1	ND	0.0091	0.4	mg/L	U
69PLT01001	69PLT01001-51	OT-D657402	1/4/99	E300	PHOSPHORUS, TOTAL PO4 (AS P)	WW	N1	ND	0.15	0.3	mg/L	U
69PLT01001	69PLT01001-54	MM-P000401	4/1/99	E300	PHOSPHORUS, TOTAL PO4 (AS P)	WW	N1	ND	0.15	0.3	mg/L	U
69PLT01001	69PLT01001-55	MM-L002101	4/6/99	E300	PHOSPHORUS, TOTAL PO4 (AS P)	WW	N1	ND	0.15	0.3	mg/L	U
69PLT01001	69PLT01001-65	MM-L004403	4/23/99	E300	PHOSPHORUS, TOTAL PO4 (AS P)	WW	N1	ND	0.15	0.3	mg/L	U
69PLT01001	69PLT01001-69	MM-P000803	5/4/99	E300	PHOSPHORUS, TOTAL PO4 (AS P)	WW	N1	ND	0.15	0.3	mg/L	U
69PLT01001	69PLT01001-74	MM-L008201	7/6/99	E300	PHOSPHORUS, TOTAL PO4 (AS P)	WW	N1	ND	0.05	0.34	mg/L	U
69PLT01001	69PLT01001-85	MM-L011301	8/3/99	E300	PHOSPHORUS, TOTAL PO4 (AS P)	WW	N1	0.04	0.026	0.3	mg/L	J
69PLT01001	69PLT01001-94	MM-L019301	9/7/99	E300	PHOSPHORUS, TOTAL PO4 (AS P)	WW	N1	0.06	0.026	0.3	mg/L	J
69PLT01001	69PLT01001-95	MM-L020601	10/1/99	E300	PHOSPHORUS, TOTAL PO4 (AS P)	WW	N1	0.04	0.026	0.3	mg/L	J
69PLT01001	69PLT01001-95	MM-L101201	10/29/99	E300	PHOSPHORUS, TOTAL PO4 (AS P)	WW	N1	ND	0.026	0.3	mg/L	U
69PLT01001	69PLT01001-	MM-L102001	11/30/99	E300	PHOSPHORUS, TOTAL PO4 (AS P)	WW	N1	ND	0.026	0.3	mg/L	U
69PLT01001	69PLT01001-51	OT-D657402	1/4/99	E300	SULFATE (AS SO4)	WW	N1	5.9	0.052	0.2	mg/L	
69PLT01001	69PLT01001-54	MM-P000401	4/1/99	E300	SULFATE (AS SO4)	WW	N1	8.9	0.052	0.2	mg/L	
69PLT01001	69PLT01001-55	MM-L002101	4/6/99	E300	SULFATE (AS SO4)	WW	N1	7.2	0.052	0.2	mg/L	
69PLT01001	69PLT01001-65	MM-L004403	4/23/99	E300	SULFATE (AS SO4)	WW	N1	7.8	0.052	0.2	mg/L	
69PLT01001	69PLT01001-69	MM-P000803	5/4/99	E300	SULFATE (AS SO4)	WW	N1	7.9	0.052	0.2	mg/L	
69PLT01001	69PLT01001-74	MM-L008201	7/6/99	E300	SULFATE (AS SO4)	WW	N1	8	0.027	0.2	mg/L	
69PLT01001	69PLT01001-85	MM-L011301	8/3/99	E300	SULFATE (AS SO4)	WW	N1	8	0.027	0.2	mg/L	
69PLT01001	69PLT01001-94	MM-L019301	9/7/99	E300	SULFATE (AS SO4)	WW	N1	8	0.027	0.2	mg/L	
69PLT01001	69PLT01001-95	MM-L020601	10/1/99	E300	SULFATE (AS SO4)	WW	N1	7.5	0.027	0.2	mg/L	
69PLT01001	69PLT01001-95	MM-L101201	10/29/99	E300	SULFATE (AS SO4)	WW	N1	7.9	0.027	0.2	mg/L	
69PLT01001	69PLT01001-	MM-L102001	11/30/99	E300	SULFATE (AS SO4)	WW	N1	7.9	0.1	0.2	mg/L	
69PLT01001	69PLT01001-51	OT-D657402	1/4/99	E310.1	ALKALINITY, TOTAL (AS CaCO3)	WW	N1	12.1	5	10	mg/L	
69PLT01001	69PLT01001-54	MM-P000401	4/1/99	E310.1	ALKALINITY, TOTAL (AS CaCO3)	WW	N1	8.1	5	10	mg/L	J
69PLT01001	69PLT01001-69	MM-P000803	5/4/99	E310.1	ALKALINITY, TOTAL (AS CaCO3)	WW	N1	12.1	5	10	mg/L	
69PLT01001	69PLT01001-74	MM-L008201	7/6/99	E310.1	ALKALINITY, TOTAL (AS CaCO3)	WW	N1	13.1	5	10	mg/L	
69PLT01001	69PLT01001-85	MM-L011302	8/3/99	E310.1	ALKALINITY, TOTAL (AS CaCO3)	WW	N1	12.1	5	10	mg/L	
69PLT01001	69PLT01001-94	MM-L019301	9/7/99	E310.1	ALKALINITY, TOTAL (AS CaCO3)	WW	N1	10.1	5	10	mg/L	
69PLT01001	69PLT01001-95	MM-L020601	10/1/99	E310.1	ALKALINITY, TOTAL (AS CaCO3)	WW	N1	20.2	5	10	mg/L	
69PLT01001	69PLT01001-95	MM-L101201	10/29/99	E310.1	ALKALINITY, TOTAL (AS CaCO3)	WW	N1	18.2	5	10	mg/L	
69PLT01001	69PLT01001-	MM-L102001	11/30/99	E310.1	ALKALINITY, TOTAL (AS CaCO3)	WW	N1	14.1	5	10	mg/L	
69PLT01001	69PLT01001-51	OT-D657403	1/4/99	E405.1	BIOLOGIC OXYGEN DEMAND, FIVE DAY	WW	N1	ND	2	2	mg/L	U
69PLT01001	69PLT01001-54	MM-P000402	4/1/99	E405.1	BIOLOGIC OXYGEN DEMAND, FIVE DAY	WW	N1	ND	3	3	mg/L	U

**Appendix D**  
**Treatment Plant Monitoring Data January - December 1999**

Location	Sample ID	Control Number	Date	Method	Analyte	Matrix	Type	Result	DL	RL	Units	Qual
69PLT01001	69PLT01001-69	MM-P000801	5/4/99	E405.1	BIOLOGIC OXYGEN DEMAND, FIVE DAY	WW	N1	ND	3	3	mg/L	U
69PLT01001	69PLT01001-74	MM-L008202	7/6/99	E405.1	BIOLOGIC OXYGEN DEMAND, FIVE DAY	WW	N1	ND	3	3	mg/L	U
69PLT01001	69PLT01001-95	MM-L020601	10/1/99	E405.1	BIOLOGIC OXYGEN DEMAND, FIVE DAY	WW	N1	ND	3	3	mg/L	U
69PLT01001	69PLT01001-51	OT-D657404	1/4/99	E410.1	COD - CHEMICAL OXYGEN DEMAND	WW	N1	ND	20	20	mg/L	U
69PLT01001	69PLT01001-54	MM-P000403	4/1/99	E410.1	COD - CHEMICAL OXYGEN DEMAND	WW	N1	ND	20	20	mg/L	U
69PLT01001	69PLT01001-69	MM-P000802	5/4/99	E410.1	COD - CHEMICAL OXYGEN DEMAND	WW	N1	ND	20	20	mg/L	U
69PLT01001	69PLT01001-74	MM-L008203	7/6/99	E410.1	COD - CHEMICAL OXYGEN DEMAND	WW	N1	ND	20	20	mg/L	U
69PLT01001	69PLT01001-95	MM-L020604	10/1/99	E410.1	COD - CHEMICAL OXYGEN DEMAND	WW	N1	ND	20	20	mg/L	U
69PLT01001	69PLT01001-51	OT-D657406	1/4/99	E415.1	DISSOLVED ORGANIC CARBON	WW	N1	0.49	0.2	1	mg/L	J
69PLT01001	69PLT01001-65	MM-L004404	4/23/99	E415.1	DISSOLVED ORGANIC CARBON	WW	N1	0.3	0.2	1	mg/L	J
69PLT01001	69PLT01001-66	MM-L004801	4/25/99	E415.1	DISSOLVED ORGANIC CARBON	WW	N1	0.4	0.2	1	mg/L	J
69PLT01001	69PLT01001-67	MM-L005001	4/27/99	E415.1	DISSOLVED ORGANIC CARBON	WW	N1	0.33	0.2	1	mg/L	J
69PLT01001	69PLT01001-68	MM-L005201	4/29/99	E415.1	DISSOLVED ORGANIC CARBON	WW	N1	0.21	0.2	1	mg/L	J
69PLT01001	69PLT01001-70	MM-L005601	5/7/99	E415.1	DISSOLVED ORGANIC CARBON	WW	N1	1.9	0.2	1	mg/L	
69PLT01001	69PLT01001-71	MM-L005801	5/14/99	E415.1	DISSOLVED ORGANIC CARBON	WW	N1	0.55	0.2	1	mg/L	J
69PLT01001	69PLT01001-72	MM-L006001	5/21/99	E415.1	DISSOLVED ORGANIC CARBON	WW	N1	0.23	0.2	1	mg/L	J
69PLT01001	69PLT01001-85	MM-L011303	8/3/99	E415.1	DISSOLVED ORGANIC CARBON	WW	N1	0.36	0.2	1	mg/L	J
69PLT01001	69PLT01001-94	MM-L019303	9/7/99	E415.1	DISSOLVED ORGANIC CARBON	WW	N1	0.36	0.2	1	mg/L	J
69PLT01001	69PLT01001-95	MM-L020602	10/1/99	E415.1	DISSOLVED ORGANIC CARBON	WW	N1	0.28	0.2	1	mg/L	J
69PLT01001	69PLT01001-95	MM-L101202	10/29/99	E415.1	DISSOLVED ORGANIC CARBON	WW	N1	0.39	0.2	1	mg/L	J
69PLT01001	69PLT01001-	MM-L102002	11/30/99	E415.1	DISSOLVED ORGANIC CARBON	WW	N1	0.36	0.2	1	mg/L	J
69PLT01001	69PLT01001-51	OT-D657405	1/4/99	E415.1	TOTAL ORGANIC CARBON	WW	N1	0.36	0.2	1	mg/L	J
69PLT01001	69PLT01001-65	MM-L004405	4/23/99	E415.1	TOTAL ORGANIC CARBON	WW	N1	0.34	0.2	1	mg/L	J
69PLT01001	69PLT01001-66	MM-L004802	4/25/99	E415.1	TOTAL ORGANIC CARBON	WW	N1	0.38	0.2	1	mg/L	J
69PLT01001	69PLT01001-67	MM-L005002	4/27/99	E415.1	TOTAL ORGANIC CARBON	WW	N1	0.41	0.2	1	mg/L	J
69PLT01001	69PLT01001-68	MM-L005202	4/29/99	E415.1	TOTAL ORGANIC CARBON	WW	N1	0.26	0.2	1	mg/L	J
69PLT01001	69PLT01001-70	MM-L005602	5/7/99	E415.1	TOTAL ORGANIC CARBON	WW	N1	1.9	0.2	1	mg/L	
69PLT01001	69PLT01001-71	MM-L005802	5/14/99	E415.1	TOTAL ORGANIC CARBON	WW	N1	0.24	0.2	1	mg/L	J
69PLT01001	69PLT01001-72	MM-L006002	5/21/99	E415.1	TOTAL ORGANIC CARBON	WW	N1	0.45	0.2	1	mg/L	J
69PLT01001	69PLT01001-85	MM-L011303	8/3/99	E415.1	TOTAL ORGANIC CARBON	WW	N1	0.34	0.2	1	mg/L	J
69PLT01001	69PLT01001-94	MM-L019302	9/7/99	E415.1	TOTAL ORGANIC CARBON	WW	N1	1.4	0.2	1	mg/L	
69PLT01001	69PLT01001-95	MM-L020603	10/1/99	E415.1	TOTAL ORGANIC CARBON	WW	N1	0.32	0.2	1	mg/L	J
69PLT01001	69PLT01001-95	MM-L101203	10/29/99	E415.1	TOTAL ORGANIC CARBON	WW	N1	0.28	0.2	1	mg/L	J
69PLT01001	69PLT01001-	MM-L102003	11/30/99	E415.1	TOTAL ORGANIC CARBON	WW	N1	0.28	0.2	1	mg/L	J
69PLT01001	69PLT01001-65	MM-L004401	4/23/99	M8015D	DIESEL HYDROCARBONS	WW	N1	-	-	-	µg/L	R
69PLT01001	69PLT01001-84	MM-L011101	7/27/99	M8015D	DIESEL HYDROCARBONS	WW	N1	30	14	100	µg/L	J
69PLT01001	69PLT01001-95	MM-L020501	10/1/99	M8015D	DIESEL HYDROCARBONS	WW	N1	100	30	100	µg/L	
69PLT01001	69PLT01001-95	MM-L101301	10/29/99	M8015D	DIESEL HYDROCARBONS	WW	N1	ND	30	100	µg/L	U
69PLT01001	69PLT01001-65	MM-L004402	4/23/99	M8015V	GASOLINE HYDROCARBONS	WW	N1	ND	5.2	25	µg/L	U
69PLT01001	69PLT01001-	MM-L102004	11/30/99	SW8015	DIESEL HYDROCARBONS	WW	N1	ND	30	100	µg/L	U

**Appendix D**  
**Treatment Plant Monitoring Data January - December 1999**

Location	Sample ID	Control Number	Date	Method	Analyte	Matrix	Type	Result	DL	RL	Units	Qual
69PLT01001	69PLT01001-51	OT-D657501	1/4/99	C200.7	ALUMINUM (TOTAL)	WW	N1	ND	22.1	100	µg/L	UJ
69PLT01001	69PLT01001-54	MM-P000601	4/1/99	C200.7	ALUMINUM (TOTAL)	WW	N1	ND	22	100	µg/L	U
69PLT01001	69PLT01001-55	MM-L002201	4/6/99	C200.7	ALUMINUM (TOTAL)	WW	N1	ND	22	100	µg/L	UJ
69PLT01001	69PLT01001-65	MM-L004601	4/23/99	C200.7	ALUMINUM (TOTAL)	WW	N1	ND	22	100	µg/L	U
69PLT01001	69PLT01001-69	MM-P001001	5/4/99	C200.7	ALUMINUM (TOTAL)	WW	N1	ND	21.7	100	µg/L	U
69PLT01001	69PLT01001-74	MM-L008301	7/6/99	C200.7	ALUMINUM (TOTAL)	WW	N1	ND	26.6	200	µg/L	U
69PLT01001	69PLT01001-95	MM-L020701	10/1/99	C200.7	ALUMINUM (TOTAL)	WW	N1	ND	47.4	200	µg/L	U
69PLT01001	69PLT01001-51	OT-D657501	1/4/99	C200.7	ANTIMONY (TOTAL)	WW	N1	ND	2.6	5	µg/L	U
69PLT01001	69PLT01001-54	MM-P000601	4/1/99	C200.7	ANTIMONY (TOTAL)	WW	N1	2.3	1.9	5	µg/L	J
69PLT01001	69PLT01001-55	MM-L002201	4/6/99	C200.7	ANTIMONY (TOTAL)	WW	N1	ND	1.9	5	µg/L	UJ
69PLT01001	69PLT01001-65	MM-L004601	4/23/99	C200.7	ANTIMONY (TOTAL)	WW	N1	ND	1.9	5	µg/L	U
69PLT01001	69PLT01001-69	MM-P001001	5/4/99	C200.7	ANTIMONY (TOTAL)	WW	N1	ND	4.3	5	µg/L	UJ
69PLT01001	69PLT01001-74	MM-L008301	7/6/99	C200.7	ANTIMONY (TOTAL)	WW	N1	ND	4.3	5	µg/L	U
69PLT01001	69PLT01001-95	MM-L020701	10/1/99	C200.7	ANTIMONY (TOTAL)	WW	N1	ND	5.7	10	µg/L	U
69PLT01001	69PLT01001-51	OT-D657501	1/4/99	C200.7	ARSENIC (TOTAL)	WW	N1	ND	2.5	5	µg/L	U
69PLT01001	69PLT01001-54	MM-P000601	4/1/99	C200.7	ARSENIC (TOTAL)	WW	N1	ND	1.9	5	µg/L	U
69PLT01001	69PLT01001-55	MM-L002201	4/6/99	C200.7	ARSENIC (TOTAL)	WW	N1	9.6	1.9	5	µg/L	
69PLT01001	69PLT01001-65	MM-L004601	4/23/99	C200.7	ARSENIC (TOTAL)	WW	N1	ND	1.9	5	µg/L	UJ
69PLT01001	69PLT01001-69	MM-P001001	5/4/99	C200.7	ARSENIC (TOTAL)	WW	N1	ND	2.1	5	µg/L	U
69PLT01001	69PLT01001-74	MM-L008301	7/6/99	C200.7	ARSENIC (TOTAL)	WW	N1	ND	2.1	5	µg/L	U
69PLT01001	69PLT01001-95	MM-L020701	10/1/99	C200.7	ARSENIC (TOTAL)	WW	N1	ND	3.3	5	µg/L	U
69PLT01001	69PLT01001-51	OT-D657501	1/4/99	C200.7	BARIUM (TOTAL)	WW	N1	ND	3.5	20	µg/L	U
69PLT01001	69PLT01001-54	MM-P000601	4/1/99	C200.7	BARIUM (TOTAL)	WW	N1	3.6	0.32	20	µg/L	J
69PLT01001	69PLT01001-55	MM-L002201	4/6/99	C200.7	BARIUM (TOTAL)	WW	N1	3	0.32	20	µg/L	J
69PLT01001	69PLT01001-65	MM-L004601	4/23/99	C200.7	BARIUM (TOTAL)	WW	N1	ND	1.7	20	µg/L	U
69PLT01001	69PLT01001-69	MM-P001001	5/4/99	C200.7	BARIUM (TOTAL)	WW	N1	ND	2.6	20	µg/L	U
69PLT01001	69PLT01001-74	MM-L008301	7/6/99	C200.7	BARIUM (TOTAL)	WW	N1	ND	2.9	20	µg/L	U
69PLT01001	69PLT01001-95	MM-L020701	10/1/99	C200.7	BARIUM (TOTAL)	WW	N1	3.4	0.58	20	µg/L	J
69PLT01001	69PLT01001-51	OT-D657501	1/4/99	C200.7	BERYLLIUM (TOTAL)	WW	N1	ND	0.19	3	µg/L	U
69PLT01001	69PLT01001-54	MM-P000601	4/1/99	C200.7	BERYLLIUM (TOTAL)	WW	N1	ND	0.42	1	µg/L	U
69PLT01001	69PLT01001-55	MM-L002201	4/6/99	C200.7	BERYLLIUM (TOTAL)	WW	N1	ND	0.42	1	µg/L	U
69PLT01001	69PLT01001-65	MM-L004601	4/23/99	C200.7	BERYLLIUM (TOTAL)	WW	N1	ND	0.42	1	µg/L	U
69PLT01001	69PLT01001-69	MM-P001001	5/4/99	C200.7	BERYLLIUM (TOTAL)	WW	N1	ND	0.14	3	µg/L	U
69PLT01001	69PLT01001-74	MM-L008301	7/6/99	C200.7	BERYLLIUM (TOTAL)	WW	N1	ND	0.14	1	µg/L	U
69PLT01001	69PLT01001-95	MM-L020701	10/1/99	C200.7	BERYLLIUM (TOTAL)	WW	N1	ND	0.26	1	µg/L	U
69PLT01001	69PLT01001-51	OT-D657501	1/4/99	C200.7	CADMIUM (TOTAL)	WW	N1	ND	0.3	1	µg/L	UJ
69PLT01001	69PLT01001-54	MM-P000601	4/1/99	C200.7	CADMIUM (TOTAL)	WW	N1	ND	0.37	1	µg/L	U
69PLT01001	69PLT01001-55	MM-L002201	4/6/99	C200.7	CADMIUM (TOTAL)	WW	N1	ND	0.37	1	µg/L	U
69PLT01001	69PLT01001-65	MM-L004601	4/23/99	C200.7	CADMIUM (TOTAL)	WW	N1	ND	0.37	1	µg/L	U
69PLT01001	69PLT01001-69	MM-P001001	5/4/99	C200.7	CADMIUM (TOTAL)	WW	N1	ND	0.33	1	µg/L	U

**Appendix D**  
**Treatment Plant Monitoring Data January - December 1999**

Location	Sample ID	Control Number	Date	Method	Analyte	Matrix	Type	Result	DL	RL	Units	Qual
69PLT01001	69PLT01001-74	MM-L008301	7/6/99	C200.7	CADMIUM (TOTAL)	WW	N1	ND	0.33	1	µg/L	U
69PLT01001	69PLT01001-95	MM-L020701	10/1/99	C200.7	CADMIUM (TOTAL)	WW	N1	ND	0.49	1	µg/L	U
69PLT01001	69PLT01001-51	OT-D657501	1/4/99	C200.7	CALCIUM (TOTAL)	WW	N1	ND	3580	3810	µg/L	UJ
69PLT01001	69PLT01001-54	MM-P000601	4/1/99	C200.7	CALCIUM (TOTAL)	WW	N1	3050	28.1	500	µg/L	
69PLT01001	69PLT01001-55	MM-L002201	4/6/99	C200.7	CALCIUM (TOTAL)	WW	N1	3170	28.1	500	µg/L	
69PLT01001	69PLT01001-65	MM-L004601	4/23/99	C200.7	CALCIUM (TOTAL)	WW	N1	3270	28.1	500	µg/L	
69PLT01001	69PLT01001-69	MM-P001001	5/4/99	C200.7	CALCIUM (TOTAL)	WW	N1	3350	37.7	500	µg/L	
69PLT01001	69PLT01001-74	MM-L008301	7/6/99	C200.7	CALCIUM (TOTAL)	WW	N1	3310	37.7	500	µg/L	
69PLT01001	69PLT01001-95	MM-L020701	10/1/99	C200.7	CALCIUM (TOTAL)	WW	N1	3250	61.4	500	µg/L	
69PLT01001	69PLT01001-51	OT-D657501	1/4/99	C200.7	CHROMIUM (TOTAL)	WW	N1	ND	0.61	5	µg/L	U
69PLT01001	69PLT01001-54	MM-P000601	4/1/99	C200.7	CHROMIUM (TOTAL)	WW	N1	ND	0.62	5	µg/L	UJ
69PLT01001	69PLT01001-55	MM-L002201	4/6/99	C200.7	CHROMIUM (TOTAL)	WW	N1	ND	0.82	6.5	µg/L	U
69PLT01001	69PLT01001-65	MM-L004601	4/23/99	C200.7	CHROMIUM (TOTAL)	WW	N1	ND	0.62	5	µg/L	UJ
69PLT01001	69PLT01001-69	MM-P001001	5/4/99	C200.7	CHROMIUM (TOTAL)	WW	N1	ND	1.2	8.5	µg/L	U
69PLT01001	69PLT01001-74	MM-L008301	7/6/99	C200.7	CHROMIUM (TOTAL)	WW	N1	ND	1.2	5	µg/L	U
69PLT01001	69PLT01001-95	MM-L020701	10/1/99	C200.7	CHROMIUM (TOTAL)	WW	N1	ND	1.2	5	µg/L	UJ
69PLT01001	69PLT01001-51	OT-D657501	1/4/99	C200.7	COBALT (TOTAL)	WW	N1	ND	0.63	6	µg/L	U
69PLT01001	69PLT01001-54	MM-P000601	4/1/99	C200.7	COBALT (TOTAL)	WW	N1	1.1	0.59	5	µg/L	J
69PLT01001	69PLT01001-55	MM-L002201	4/6/99	C200.7	COBALT (TOTAL)	WW	N1	ND	1.2	5	µg/L	U
69PLT01001	69PLT01001-65	MM-L004601	4/23/99	C200.7	COBALT (TOTAL)	WW	N1	ND	0.59	5	µg/L	U
69PLT01001	69PLT01001-69	MM-P001001	5/4/99	C200.7	COBALT (TOTAL)	WW	N1	ND	0.87	5	µg/L	U
69PLT01001	69PLT01001-74	MM-L008301	7/6/99	C200.7	COBALT (TOTAL)	WW	N1	ND	0.87	5	µg/L	U
69PLT01001	69PLT01001-95	MM-L020701	10/1/99	C200.7	COBALT (TOTAL)	WW	N1	ND	1.2	5	µg/L	U
69PLT01001	69PLT01001-51	OT-D657501	1/4/99	C200.7	COPPER (TOTAL)	WW	N1	ND	1.9	5	µg/L	U
69PLT01001	69PLT01001-54	MM-P000601	4/1/99	C200.7	COPPER (TOTAL)	WW	N1	1.1	0.83	5	µg/L	J
69PLT01001	69PLT01001-55	MM-L002201	4/6/99	C200.7	COPPER (TOTAL)	WW	N1	ND	0.83	5	µg/L	UJ
69PLT01001	69PLT01001-65	MM-L004601	4/23/99	C200.7	COPPER (TOTAL)	WW	N1	ND	0.83	5	µg/L	UJ
69PLT01001	69PLT01001-69	MM-P001001	5/4/99	C200.7	COPPER (TOTAL)	WW	N1	ND	1.2	5	µg/L	UJ
69PLT01001	69PLT01001-74	MM-L008301	7/6/99	C200.7	COPPER (TOTAL)	WW	N1	ND	1.2	5	µg/L	UJ
69PLT01001	69PLT01001-95	MM-L020701	10/1/99	C200.7	COPPER (TOTAL)	WW	N1	ND	1.3	5	µg/L	UJ
69PLT01001	69PLT01001-51	OT-D657501	1/4/99	C200.7	IRON (TOTAL)	WW	N1	ND	9.5	100	µg/L	U
69PLT01001	69PLT01001-54	MM-P000601	4/1/99	C200.7	IRON (TOTAL)	WW	N1	22.2	15.6	100	µg/L	J
69PLT01001	69PLT01001-55	MM-L002201	4/6/99	C200.7	IRON (TOTAL)	WW	N1	94.5	15.6	100	µg/L	J
69PLT01001	69PLT01001-65	MM-L004601	4/23/99	C200.7	IRON (TOTAL)	WW	N1	ND	15.6	100	µg/L	U
69PLT01001	69PLT01001-69	MM-P001001	5/4/99	C200.7	IRON (TOTAL)	WW	N1	ND	20.1	100	µg/L	U
69PLT01001	69PLT01001-74	MM-L008301	7/6/99	C200.7	IRON (TOTAL)	WW	N1	ND	20.1	100	µg/L	UJ
69PLT01001	69PLT01001-95	MM-L020701	10/1/99	C200.7	IRON (TOTAL)	WW	N1	ND	33.6	100	µg/L	U
69PLT01001	69PLT01001-51	OT-D657501	1/4/99	C200.7	LEAD (TOTAL)	WW	N1	ND	1.2	2	µg/L	U
69PLT01001	69PLT01001-54	MM-P000601	4/1/99	C200.7	LEAD (TOTAL)	WW	N1	ND	1.1	2	µg/L	U
69PLT01001	69PLT01001-55	MM-L002201	4/6/99	C200.7	LEAD (TOTAL)	WW	N1	ND	1.1	2	µg/L	U

**Appendix D**  
**Treatment Plant Monitoring Data January - December 1999**

Location	Sample ID	Control Number	Date	Method	Analyte	Matrix	Type	Result	DL	RL	Units	Qual
69PLT01001	69PLT01001-65	MM-L004601	4/23/99	C200.7	LEAD (TOTAL)	WW	N1	ND	1.1	2	µg/L	U
69PLT01001	69PLT01001-69	MM-P001001	5/4/99	C200.7	LEAD (TOTAL)	WW	N1	ND	1.1	2	µg/L	U
69PLT01001	69PLT01001-74	MM-L008301	7/6/99	C200.7	LEAD (TOTAL)	WW	N1	ND	1.1	2	µg/L	U
69PLT01001	69PLT01001-95	MM-L020701	10/1/99	C200.7	LEAD (TOTAL)	WW	N1	ND	1.7	2	µg/L	U
69PLT01001	69PLT01001-51	OT-D657501	1/4/99	C200.7	MAGNESIUM (TOTAL)	WW	N1	1790	25.2	500	µg/L	
69PLT01001	69PLT01001-54	MM-P000601	4/1/99	C200.7	MAGNESIUM (TOTAL)	WW	N1	1580	21.8	500	µg/L	
69PLT01001	69PLT01001-55	MM-L002201	4/6/99	C200.7	MAGNESIUM (TOTAL)	WW	N1	1450	21.8	500	µg/L	
69PLT01001	69PLT01001-65	MM-L004601	4/23/99	C200.7	MAGNESIUM (TOTAL)	WW	N1	1610	21.8	500	µg/L	
69PLT01001	69PLT01001-69	MM-P001001	5/4/99	C200.7	MAGNESIUM (TOTAL)	WW	N1	1670	21.1	500	µg/L	
69PLT01001	69PLT01001-74	MM-L008301	7/6/99	C200.7	MAGNESIUM (TOTAL)	WW	N1	1610	21.1	500	µg/L	
69PLT01001	69PLT01001-95	MM-L020701	10/1/99	C200.7	MAGNESIUM (TOTAL)	WW	N1	1610	52.8	500	µg/L	
69PLT01001	69PLT01001-51	OT-D657501	1/4/99	C200.7	MANGANESE (TOTAL)	WW	N1	ND	2.7	10	µg/L	U
69PLT01001	69PLT01001-54	MM-P000601	4/1/99	C200.7	MANGANESE (TOTAL)	WW	N1	4.3	0.33	10	µg/L	J
69PLT01001	69PLT01001-55	MM-L002201	4/6/99	C200.7	MANGANESE (TOTAL)	WW	N1	4.1	0.33	10	µg/L	J
69PLT01001	69PLT01001-65	MM-L004601	4/23/99	C200.7	MANGANESE (TOTAL)	WW	N1	ND	3	10	µg/L	U
69PLT01001	69PLT01001-69	MM-P001001	5/4/99	C200.7	MANGANESE (TOTAL)	WW	N1	ND	3.6	10	µg/L	U
69PLT01001	69PLT01001-74	MM-L008301	7/6/99	C200.7	MANGANESE (TOTAL)	WW	N1	4.4	0.42	10	µg/L	J
69PLT01001	69PLT01001-95	MM-L020701	10/1/99	C200.7	MANGANESE (TOTAL)	WW	N1	4.2	0.42	10	µg/L	J
69PLT01001	69PLT01001-51	OT-D657501	1/4/99	C200.7	NICKEL (TOTAL)	WW	N1	ND	0.89	20	µg/L	U
69PLT01001	69PLT01001-54	MM-P000601	4/1/99	C200.7	NICKEL (TOTAL)	WW	N1	1.4	1.4	20	µg/L	J
69PLT01001	69PLT01001-55	MM-L002201	4/6/99	C200.7	NICKEL (TOTAL)	WW	N1	ND	1.4	20	µg/L	U
69PLT01001	69PLT01001-65	MM-L004601	4/23/99	C200.7	NICKEL (TOTAL)	WW	N1	ND	1.4	20	µg/L	U
69PLT01001	69PLT01001-69	MM-P001001	5/4/99	C200.7	NICKEL (TOTAL)	WW	N1	ND	1.9	20	µg/L	U
69PLT01001	69PLT01001-74	MM-L008301	7/6/99	C200.7	NICKEL (TOTAL)	WW	N1	ND	1.9	20	µg/L	U
69PLT01001	69PLT01001-95	MM-L020701	10/1/99	C200.7	NICKEL (TOTAL)	WW	N1	ND	1.8	20	µg/L	U
69PLT01001	69PLT01001-51	OT-D657501	1/4/99	C200.7	POTASSIUM (TOTAL)	WW	N1	1270	726	1500	µg/L	J
69PLT01001	69PLT01001-54	MM-P000601	4/1/99	C200.7	POTASSIUM (TOTAL)	WW	N1	750	46.3	1500	µg/L	J
69PLT01001	69PLT01001-55	MM-L002201	4/6/99	C200.7	POTASSIUM (TOTAL)	WW	N1	788	46.3	1500	µg/L	J
69PLT01001	69PLT01001-65	MM-L004601	4/23/99	C200.7	POTASSIUM (TOTAL)	WW	N1	ND	1180	1932	µg/L	U
69PLT01001	69PLT01001-69	MM-P001001	5/4/99	C200.7	POTASSIUM (TOTAL)	WW	N1	1090	112	1500	µg/L	J
69PLT01001	69PLT01001-74	MM-L008301	7/6/99	C200.7	POTASSIUM (TOTAL)	WW	N1	941	112	1500	µg/L	J
69PLT01001	69PLT01001-95	MM-L020701	10/1/99	C200.7	POTASSIUM (TOTAL)	WW	N1	815	158	1500	µg/L	J
69PLT01001	69PLT01001-51	OT-D657501	1/4/99	C200.7	SELENIUM (TOTAL)	WW	N1	ND	2.4	5	µg/L	U
69PLT01001	69PLT01001-54	MM-P000601	4/1/99	C200.7	SELENIUM (TOTAL)	WW	N1	ND	2.7	5	µg/L	U
69PLT01001	69PLT01001-55	MM-L002201	4/6/99	C200.7	SELENIUM (TOTAL)	WW	N1	ND	2.7	5	µg/L	U
69PLT01001	69PLT01001-65	MM-L004601	4/23/99	C200.7	SELENIUM (TOTAL)	WW	N1	ND	2.7	5	µg/L	U
69PLT01001	69PLT01001-69	MM-P001001	5/4/99	C200.7	SELENIUM (TOTAL)	WW	N1	ND	2.7	5	µg/L	U
69PLT01001	69PLT01001-74	MM-L008301	7/6/99	C200.7	SELENIUM (TOTAL)	WW	N1	ND	2.7	5	µg/L	U
69PLT01001	69PLT01001-95	MM-L020701	10/1/99	C200.7	SELENIUM (TOTAL)	WW	N1	ND	3.8	5	µg/L	U
69PLT01001	69PLT01001-51	OT-D657501	1/4/99	C200.7	SILVER (TOTAL)	WW	N1	ND	0.56	10	µg/L	UJ

**Appendix D**  
**Treatment Plant Monitoring Data January - December 1999**

Location	Sample ID	Control Number	Date	Method	Analyte	Matrix	Type	Result	DL	RL	Units	Qual
69PLT01001	69PLT01001-54	MM-P000601	4/1/99	C200.7	SILVER (TOTAL)	WW	N1	ND	0.8	10	µg/L	UJ
69PLT01001	69PLT01001-55	MM-L002201	4/6/99	C200.7	SILVER (TOTAL)	WW	N1	ND	0.86	10	µg/L	U
69PLT01001	69PLT01001-65	MM-L004601	4/23/99	C200.7	SILVER (TOTAL)	WW	N1	ND	0.8	10	µg/L	UJ
69PLT01001	69PLT01001-69	MM-P001001	5/4/99	C200.7	SILVER (TOTAL)	WW	N1	ND	1.7	11.5	µg/L	U
69PLT01001	69PLT01001-74	MM-L008301	7/6/99	C200.7	SILVER (TOTAL)	WW	N1	ND	1.7	10	µg/L	U
69PLT01001	69PLT01001-95	MM-L020701	10/1/99	C200.7	SILVER (TOTAL)	WW	N1	ND	1.9	10	µg/L	U
69PLT01001	69PLT01001-51	OT-D657501	1/4/99	C200.7	SODIUM (TOTAL)	WW	N1	8810	22.9	500	µg/L	
69PLT01001	69PLT01001-54	MM-P000601	4/1/99	C200.7	SODIUM (TOTAL)	WW	N1	8010	98.8	500	µg/L	
69PLT01001	69PLT01001-55	MM-L002201	4/6/99	C200.7	SODIUM (TOTAL)	WW	N1	7980	98.8	500	µg/L	
69PLT01001	69PLT01001-65	MM-L004601	4/23/99	C200.7	SODIUM (TOTAL)	WW	N1	7990	98.8	500	µg/L	
69PLT01001	69PLT01001-69	MM-P001001	5/4/99	C200.7	SODIUM (TOTAL)	WW	N1	8570	357	500	µg/L	
69PLT01001	69PLT01001-74	MM-L008301	7/6/99	C200.7	SODIUM (TOTAL)	WW	N1	8140	357	1500	µg/L	
69PLT01001	69PLT01001-95	MM-L020701	10/1/99	C200.7	SODIUM (TOTAL)	WW	N1	8190	465	1500	µg/L	
69PLT01001	69PLT01001-51	OT-D657501	1/4/99	C200.7	THALLIUM (TOTAL)	WW	N1	-	-	-	µg/L	R
69PLT01001	69PLT01001-54	MM-P000601	4/1/99	C200.7	THALLIUM (TOTAL)	WW	N1	ND	4.1	17	µg/L	U
69PLT01001	69PLT01001-55	MM-L002201	4/6/99	C200.7	THALLIUM (TOTAL)	WW	N1	ND	2.5	10	µg/L	U
69PLT01001	69PLT01001-65	MM-L004601	4/23/99	C200.7	THALLIUM (TOTAL)	WW	N1	ND	2.5	10	µg/L	U
69PLT01001	69PLT01001-69	MM-P001001	5/4/99	C200.7	THALLIUM (TOTAL)	WW	N1	ND	6.5	33.5	µg/L	U
69PLT01001	69PLT01001-74	MM-L008301	7/6/99	C200.7	THALLIUM (TOTAL)	WW	N1	ND	3.8	10	µg/L	U
69PLT01001	69PLT01001-95	MM-L020701	10/1/99	C200.7	THALLIUM (TOTAL)	WW	N1	ND	4.3	10	µg/L	U
69PLT01001	69PLT01001-51	OT-D657501	1/4/99	C200.7	VANADIUM (TOTAL)	WW	N1	ND	0.54	10	µg/L	U
69PLT01001	69PLT01001-54	MM-P000601	4/1/99	C200.7	VANADIUM (TOTAL)	WW	N1	1.1	0.96	10	µg/L	J
69PLT01001	69PLT01001-55	MM-L002201	4/6/99	C200.7	VANADIUM (TOTAL)	WW	N1	ND	1.4	10	µg/L	U
69PLT01001	69PLT01001-65	MM-L004601	4/23/99	C200.7	VANADIUM (TOTAL)	WW	N1	ND	0.96	10	µg/L	U
69PLT01001	69PLT01001-69	MM-P001001	5/4/99	C200.7	VANADIUM (TOTAL)	WW	N1	ND	1.1	10	µg/L	U
69PLT01001	69PLT01001-74	MM-L008301	7/6/99	C200.7	VANADIUM (TOTAL)	WW	N1	ND	1.1	10	µg/L	U
69PLT01001	69PLT01001-95	MM-L020701	10/1/99	C200.7	VANADIUM (TOTAL)	WW	N1	ND	1.4	10	µg/L	U
69PLT01001	69PLT01001-51	OT-D657501	1/4/99	C200.7	ZINC (TOTAL)	WW	N1	52.1	0.64	20	µg/L	
69PLT01001	69PLT01001-54	MM-P000601	4/1/99	C200.7	ZINC (TOTAL)	WW	N1	ND	39.4	70	µg/L	U
69PLT01001	69PLT01001-55	MM-L002201	4/6/99	C200.7	ZINC (TOTAL)	WW	N1	95	1.9	20	µg/L	
69PLT01001	69PLT01001-65	MM-L004601	4/23/99	C200.7	ZINC (TOTAL)	WW	N1	32.5	1.9	20	µg/L	
69PLT01001	69PLT01001-69	MM-P001001	5/4/99	C200.7	ZINC (TOTAL)	WW	N1	33	3.7	20	µg/L	
69PLT01001	69PLT01001-74	MM-L008301	7/6/99	C200.7	ZINC (TOTAL)	WW	N1	35	3.7	20	µg/L	
69PLT01001	69PLT01001-95	MM-L020701	10/1/99	C200.7	ZINC (TOTAL)	WW	N1	39.1	1.9	20	µg/L	
69PLT01001	69PLT01001-51	OT-D657501	1/4/99	C245.2	MERCURY (TOTAL)	WW	N1	ND	0.051	0.2	µg/L	U
69PLT01001	69PLT01001-54	MM-P000601	4/1/99	C245.2	MERCURY (TOTAL)	WW	N1	ND	0.092	0.475	µg/L	U
69PLT01001	69PLT01001-55	MM-L002201	4/6/99	C245.2	MERCURY (TOTAL)	WW	N1	ND	0.05	0.2	µg/L	U
69PLT01001	69PLT01001-65	MM-L004601	4/23/99	C245.2	MERCURY (TOTAL)	WW	N1	ND	0.05	0.2	µg/L	U
69PLT01001	69PLT01001-69	MM-P001001	5/4/99	C245.2	MERCURY (TOTAL)	WW	N1	ND	0.05	0.2	µg/L	U
69PLT01001	69PLT01001-74	MM-L008301	7/6/99	C245.2	MERCURY (TOTAL)	WW	N1	ND	0.05	0.2	µg/L	UJ

**Appendix D**  
**Treatment Plant Monitoring Data January - December 1999**

Location	Sample ID	Control Number	Date	Method	Analyte	Matrix	Type	Result	DL	RL	Units	Qual
69PLT01001	69PLT01001-95	MM-L020701	10/1/99	C245.2	MERCURY (TOTAL)	WW	N1	ND	0.05	0.2	µg/L	U
69PLT01001	69PLT01001-55	MM-L002002	4/6/99	SW8260	1,1,1-TRICHLOROETHANE	WW	N1	ND	0.328	1	µg/L	U
69PLT01001	69PLT01001-65	MM-L004302	4/23/99	SW8260	1,1,1-TRICHLOROETHANE	WW	N1	ND	0.328	1	µg/L	U
69PLT01001	69PLT01001-66	MM-L004702	4/25/99	SW8260	1,1,1-TRICHLOROETHANE	WW	N1	ND	0.328	1	µg/L	U
69PLT01001	69PLT01001-67	MM-L004902	4/27/99	SW8260	1,1,1-TRICHLOROETHANE	WW	N1	ND	0.328	1	µg/L	U
69PLT01001	69PLT01001-68	MM-L005102	4/29/99	SW8260	1,1,1-TRICHLOROETHANE	WW	N1	ND	0.328	1	µg/L	U
69PLT01001	69PLT01001-70	MM-L005502	5/7/99	SW8260	1,1,1-TRICHLOROETHANE	WW	N1	ND	0.328	1	µg/L	U
69PLT01001	69PLT01001-71	MM-L005702	5/14/99	SW8260	1,1,1-TRICHLOROETHANE	WW	N1	ND	0.328	1	µg/L	U
69PLT01001	69PLT01001-72	MM-L005902	5/21/99	SW8260	1,1,1-TRICHLOROETHANE	WW	N1	ND	0.328	1	µg/L	U
69PLT01001	69PLT01001-73	MM-L006702	6/2/99	SW8260	1,1,1-TRICHLOROETHANE	WW	N1	ND	0.328	1	µg/L	U
69PLT01001	69PLT01001-85	MM-L011202	8/3/99	SW8260	1,1,1-TRICHLOROETHANE	WW	N1	ND	0.328	1	µg/L	U
69PLT01001	69PLT01001-93	MM-L019202	9/7/99	SW8260	1,1,1-TRICHLOROETHANE	WW	N1	ND	0.328	1	µg/L	U
69PLT01001	69PLT01001-95	MM-L020402	10/1/99	SW8260	1,1,1-TRICHLOROETHANE	WW	N1	ND	0.328	1	µg/L	U
69PLT01001	69PLT01001-95	MM-L011102	10/29/99	SW8260	1,1,1-TRICHLOROETHANE	WW	N1	ND	0.328	1	µg/L	U
69PLT01001	69PLT01001-55	MM-L002002	4/6/99	SW8260	1,1-DICHLOROETHENE	WW	N1	ND	0.532	1	µg/L	U
69PLT01001	69PLT01001-65	MM-L004302	4/23/99	SW8260	1,1-DICHLOROETHENE	WW	N1	ND	0.532	1	µg/L	U
69PLT01001	69PLT01001-66	MM-L004702	4/25/99	SW8260	1,1-DICHLOROETHENE	WW	N1	ND	0.532	1	µg/L	U
69PLT01001	69PLT01001-67	MM-L004902	4/27/99	SW8260	1,1-DICHLOROETHENE	WW	N1	ND	0.532	1	µg/L	U
69PLT01001	69PLT01001-68	MM-L005102	4/29/99	SW8260	1,1-DICHLOROETHENE	WW	N1	ND	0.532	1	µg/L	U
69PLT01001	69PLT01001-70	MM-L005502	5/7/99	SW8260	1,1-DICHLOROETHENE	WW	N1	ND	0.532	1	µg/L	U
69PLT01001	69PLT01001-71	MM-L005702	5/14/99	SW8260	1,1-DICHLOROETHENE	WW	N1	ND	0.532	1	µg/L	U
69PLT01001	69PLT01001-72	MM-L005902	5/21/99	SW8260	1,1-DICHLOROETHENE	WW	N1	ND	0.532	1	µg/L	U
69PLT01001	69PLT01001-73	MM-L006702	6/2/99	SW8260	1,1-DICHLOROETHENE	WW	N1	ND	0.532	1	µg/L	U
69PLT01001	69PLT01001-85	MM-L011202	8/3/99	SW8260	1,1-DICHLOROETHENE	WW	N1	ND	0.532	1	µg/L	U
69PLT01001	69PLT01001-93	MM-L019202	9/7/99	SW8260	1,1-DICHLOROETHENE	WW	N1	ND	0.532	1	µg/L	U
69PLT01001	69PLT01001-95	MM-L020402	10/1/99	SW8260	1,1-DICHLOROETHENE	WW	N1	ND	0.532	1	µg/L	U
69PLT01001	69PLT01001-95	MM-L011102	10/29/99	SW8260	1,1-DICHLOROETHENE	WW	N1	ND	0.532	1	µg/L	U
69PLT01001	69PLT01001-55	MM-L002002	4/6/99	SW8260	BENZENE	WW	N1	ND	0.371	1	µg/L	U
69PLT01001	69PLT01001-65	MM-L004302	4/23/99	SW8260	BENZENE	WW	N1	ND	0.371	1	µg/L	U
69PLT01001	69PLT01001-66	MM-L004702	4/25/99	SW8260	BENZENE	WW	N1	ND	0.371	1	µg/L	U
69PLT01001	69PLT01001-67	MM-L004902	4/27/99	SW8260	BENZENE	WW	N1	ND	0.371	1	µg/L	U
69PLT01001	69PLT01001-68	MM-L005102	4/29/99	SW8260	BENZENE	WW	N1	ND	0.371	1	µg/L	U
69PLT01001	69PLT01001-70	MM-L005502	5/7/99	SW8260	BENZENE	WW	N1	ND	0.371	1	µg/L	U
69PLT01001	69PLT01001-71	MM-L005702	5/14/99	SW8260	BENZENE	WW	N1	ND	0.371	1	µg/L	U
69PLT01001	69PLT01001-72	MM-L005902	5/21/99	SW8260	BENZENE	WW	N1	ND	0.371	1	µg/L	U
69PLT01001	69PLT01001-73	MM-L006702	6/2/99	SW8260	BENZENE	WW	N1	ND	0.371	1	µg/L	U
69PLT01001	69PLT01001-85	MM-L011202	8/3/99	SW8260	BENZENE	WW	N1	ND	0.371	1	µg/L	U
69PLT01001	69PLT01001-93	MM-L019202	9/7/99	SW8260	BENZENE	WW	N1	ND	0.371	1	µg/L	U
69PLT01001	69PLT01001-95	MM-L020402	10/1/99	SW8260	BENZENE	WW	N1	ND	0.371	1	µg/L	U
69PLT01001	69PLT01001-95	MM-L011102	10/29/99	SW8260	BENZENE	WW	N1	ND	0.371	1	µg/L	U

**Appendix D**  
**Treatment Plant Monitoring Data January - December 1999**

Location	Sample ID	Control Number	Date	Method	Analyte	Matrix	Type	Result	DL	RL	Units	Qual
69PLT01001	69PLT01001-55	MM-L002002	4/6/99	SW8260	CARBON TETRACHLORIDE	WW	N1	ND	0.222	1	µg/L	U
69PLT01001	69PLT01001-65	MM-L004302	4/23/99	SW8260	CARBON TETRACHLORIDE	WW	N1	ND	0.222	1	µg/L	U
69PLT01001	69PLT01001-66	MM-L004702	4/25/99	SW8260	CARBON TETRACHLORIDE	WW	N1	ND	0.222	1	µg/L	U
69PLT01001	69PLT01001-67	MM-L004902	4/27/99	SW8260	CARBON TETRACHLORIDE	WW	N1	ND	0.222	1	µg/L	U
69PLT01001	69PLT01001-68	MM-L005102	4/29/99	SW8260	CARBON TETRACHLORIDE	WW	N1	ND	0.222	1	µg/L	U
69PLT01001	69PLT01001-70	MM-L005502	5/7/99	SW8260	CARBON TETRACHLORIDE	WW	N1	ND	0.222	1	µg/L	U
69PLT01001	69PLT01001-71	MM-L005702	5/14/99	SW8260	CARBON TETRACHLORIDE	WW	N1	ND	0.222	1	µg/L	U
69PLT01001	69PLT01001-72	MM-L005902	5/21/99	SW8260	CARBON TETRACHLORIDE	WW	N1	ND	0.222	1	µg/L	U
69PLT01001	69PLT01001-73	MM-L006702	6/2/99	SW8260	CARBON TETRACHLORIDE	WW	N1	ND	0.222	1	µg/L	U
69PLT01001	69PLT01001-85	MM-L011202	8/3/99	SW8260	CARBON TETRACHLORIDE	WW	N1	ND	0.222	1	µg/L	U
69PLT01001	69PLT01001-93	MM-L019202	9/7/99	SW8260	CARBON TETRACHLORIDE	WW	N1	ND	0.222	1	µg/L	U
69PLT01001	69PLT01001-95	MM-L020402	10/1/99	SW8260	CARBON TETRACHLORIDE	WW	N1	ND	0.222	1	µg/L	U
69PLT01001	69PLT01001-95	MM-L101102	10/29/99	SW8260	CARBON TETRACHLORIDE	WW	N1	ND	0.222	1	µg/L	U
69PLT01001	69PLT01001-55	MM-L002002	4/6/99	SW8260	CIS-1,2-DICHLOROETHENE	WW	N1	ND	0.215	1	µg/L	U
69PLT01001	69PLT01001-65	MM-L004302	4/23/99	SW8260	CIS-1,2-DICHLOROETHENE	WW	N1	ND	0.215	1	µg/L	U
69PLT01001	69PLT01001-66	MM-L004702	4/25/99	SW8260	CIS-1,2-DICHLOROETHENE	WW	N1	ND	0.215	1	µg/L	U
69PLT01001	69PLT01001-67	MM-L004902	4/27/99	SW8260	CIS-1,2-DICHLOROETHENE	WW	N1	ND	0.215	1	µg/L	U
69PLT01001	69PLT01001-68	MM-L005102	4/29/99	SW8260	CIS-1,2-DICHLOROETHENE	WW	N1	ND	0.215	1	µg/L	U
69PLT01001	69PLT01001-70	MM-L005502	5/7/99	SW8260	CIS-1,2-DICHLOROETHENE	WW	N1	ND	0.215	1	µg/L	U
69PLT01001	69PLT01001-71	MM-L005702	5/14/99	SW8260	CIS-1,2-DICHLOROETHENE	WW	N1	ND	0.215	1	µg/L	U
69PLT01001	69PLT01001-72	MM-L005902	5/21/99	SW8260	CIS-1,2-DICHLOROETHENE	WW	N1	ND	0.215	1	µg/L	U
69PLT01001	69PLT01001-73	MM-L006702	6/2/99	SW8260	CIS-1,2-DICHLOROETHENE	WW	N1	ND	0.215	1	µg/L	U
69PLT01001	69PLT01001-85	MM-L011202	8/3/99	SW8260	CIS-1,2-DICHLOROETHENE	WW	N1	ND	0.215	1	µg/L	U
69PLT01001	69PLT01001-93	MM-L019202	9/7/99	SW8260	CIS-1,2-DICHLOROETHENE	WW	N1	ND	0.215	1	µg/L	U
69PLT01001	69PLT01001-95	MM-L020402	10/1/99	SW8260	CIS-1,2-DICHLOROETHENE	WW	N1	ND	0.215	1	µg/L	U
69PLT01001	69PLT01001-95	MM-L101102	10/29/99	SW8260	CIS-1,2-DICHLOROETHENE	WW	N1	ND	0.215	1	µg/L	U
69PLT01001	69PLT01001-55	MM-L002002	4/6/99	SW8260	ETHYLBENZENE	WW	N1	ND	0.282	1	µg/L	U
69PLT01001	69PLT01001-65	MM-L004302	4/23/99	SW8260	ETHYLBENZENE	WW	N1	ND	0.282	1	µg/L	U
69PLT01001	69PLT01001-66	MM-L004702	4/25/99	SW8260	ETHYLBENZENE	WW	N1	ND	0.282	1	µg/L	U
69PLT01001	69PLT01001-67	MM-L004902	4/27/99	SW8260	ETHYLBENZENE	WW	N1	ND	0.282	1	µg/L	U
69PLT01001	69PLT01001-68	MM-L005102	4/29/99	SW8260	ETHYLBENZENE	WW	N1	ND	0.282	1	µg/L	U
69PLT01001	69PLT01001-70	MM-L005502	5/7/99	SW8260	ETHYLBENZENE	WW	N1	ND	0.282	1	µg/L	U
69PLT01001	69PLT01001-71	MM-L005702	5/14/99	SW8260	ETHYLBENZENE	WW	N1	ND	0.282	1	µg/L	U
69PLT01001	69PLT01001-72	MM-L005902	5/21/99	SW8260	ETHYLBENZENE	WW	N1	ND	0.282	1	µg/L	U
69PLT01001	69PLT01001-73	MM-L006702	6/2/99	SW8260	ETHYLBENZENE	WW	N1	ND	0.282	1	µg/L	U
69PLT01001	69PLT01001-85	MM-L011202	8/3/99	SW8260	ETHYLBENZENE	WW	N1	ND	0.282	1	µg/L	U
69PLT01001	69PLT01001-93	MM-L019202	9/7/99	SW8260	ETHYLBENZENE	WW	N1	ND	0.282	1	µg/L	U
69PLT01001	69PLT01001-95	MM-L020402	10/1/99	SW8260	ETHYLBENZENE	WW	N1	ND	0.282	1	µg/L	U
69PLT01001	69PLT01001-95	MM-L101102	10/29/99	SW8260	ETHYLBENZENE	WW	N1	ND	0.282	1	µg/L	U
69PLT01001	69PLT01001-55	MM-L002002	4/6/99	SW8260	M,P-XYLENE (SUM OF ISOMERS)	WW	N1	ND	0.406	1	µg/L	U

**Appendix D**  
**Treatment Plant Monitoring Data January - December 1999**

Location	Sample ID	Control Number	Date	Method	Analyte	Matrix	Type	Result	DL	RL	Units	Qual
69PLT01001	69PLT01001-65	MM-L004302	4/23/99	SW8260	M,P-XYLENE (SUM OF ISOMERS)	WW	N1	ND	0.406	1	µg/L	U
69PLT01001	69PLT01001-66	MM-L004702	4/25/99	SW8260	M,P-XYLENE (SUM OF ISOMERS)	WW	N1	ND	0.406	1	µg/L	U
69PLT01001	69PLT01001-67	MM-L004902	4/27/99	SW8260	M,P-XYLENE (SUM OF ISOMERS)	WW	N1	ND	0.406	1	µg/L	U
69PLT01001	69PLT01001-68	MM-L005102	4/29/99	SW8260	M,P-XYLENE (SUM OF ISOMERS)	WW	N1	ND	0.406	1	µg/L	U
69PLT01001	69PLT01001-70	MM-L005502	5/7/99	SW8260	M,P-XYLENE (SUM OF ISOMERS)	WW	N1	ND	0.406	1	µg/L	U
69PLT01001	69PLT01001-71	MM-L005702	5/14/99	SW8260	M,P-XYLENE (SUM OF ISOMERS)	WW	N1	ND	0.406	1	µg/L	U
69PLT01001	69PLT01001-72	MM-L005902	5/21/99	SW8260	M,P-XYLENE (SUM OF ISOMERS)	WW	N1	ND	0.406	1	µg/L	U
69PLT01001	69PLT01001-73	MM-L006702	6/2/99	SW8260	M,P-XYLENE (SUM OF ISOMERS)	WW	N1	ND	0.406	2	µg/L	U
69PLT01001	69PLT01001-85	MM-L011202	8/3/99	SW8260	M,P-XYLENE (SUM OF ISOMERS)	WW	N1	ND	0.406	2	µg/L	U
69PLT01001	69PLT01001-93	MM-L019202	9/7/99	SW8260	M,P-XYLENE (SUM OF ISOMERS)	WW	N1	ND	0.406	1	µg/L	U
69PLT01001	69PLT01001-95	MM-L020402	10/1/99	SW8260	M,P-XYLENE (SUM OF ISOMERS)	WW	N1	ND	0.406	1	µg/L	U
69PLT01001	69PLT01001-95	MM-L101102	10/29/99	SW8260	M,P-XYLENE (SUM OF ISOMERS)	WW	N1	ND	0.406	1	µg/L	U
69PLT01001	69PLT01001-55	MM-L002002	4/6/99	SW8260	O-XYLENE (1,2-DIMETHYLBENZENE)	WW	N1	ND	0.289	1	µg/L	U
69PLT01001	69PLT01001-65	MM-L004302	4/23/99	SW8260	O-XYLENE (1,2-DIMETHYLBENZENE)	WW	N1	ND	0.289	1	µg/L	U
69PLT01001	69PLT01001-66	MM-L004702	4/25/99	SW8260	O-XYLENE (1,2-DIMETHYLBENZENE)	WW	N1	ND	0.289	1	µg/L	U
69PLT01001	69PLT01001-67	MM-L004902	4/27/99	SW8260	O-XYLENE (1,2-DIMETHYLBENZENE)	WW	N1	ND	0.289	1	µg/L	U
69PLT01001	69PLT01001-68	MM-L005102	4/29/99	SW8260	O-XYLENE (1,2-DIMETHYLBENZENE)	WW	N1	ND	0.289	1	µg/L	U
69PLT01001	69PLT01001-70	MM-L005502	5/7/99	SW8260	O-XYLENE (1,2-DIMETHYLBENZENE)	WW	N1	ND	0.289	1	µg/L	U
69PLT01001	69PLT01001-71	MM-L005702	5/14/99	SW8260	O-XYLENE (1,2-DIMETHYLBENZENE)	WW	N1	ND	0.289	1	µg/L	U
69PLT01001	69PLT01001-72	MM-L005902	5/21/99	SW8260	O-XYLENE (1,2-DIMETHYLBENZENE)	WW	N1	ND	0.289	1	µg/L	U
69PLT01001	69PLT01001-73	MM-L006702	6/2/99	SW8260	O-XYLENE (1,2-DIMETHYLBENZENE)	WW	N1	ND	0.289	1	µg/L	U
69PLT01001	69PLT01001-85	MM-L011202	8/3/99	SW8260	O-XYLENE (1,2-DIMETHYLBENZENE)	WW	N1	ND	0.289	1	µg/L	U
69PLT01001	69PLT01001-93	MM-L019202	9/7/99	SW8260	O-XYLENE (1,2-DIMETHYLBENZENE)	WW	N1	ND	0.289	1	µg/L	U
69PLT01001	69PLT01001-95	MM-L020402	10/1/99	SW8260	O-XYLENE (1,2-DIMETHYLBENZENE)	WW	N1	ND	0.289	1	µg/L	U
69PLT01001	69PLT01001-95	MM-L101102	10/29/99	SW8260	O-XYLENE (1,2-DIMETHYLBENZENE)	WW	N1	ND	0.289	1	µg/L	U
69PLT01001	69PLT01001-55	MM-L002002	4/6/99	SW8260	TETRACHLOROETHENE(PCE)	WW	N1	ND	0.288	1	µg/L	U
69PLT01001	69PLT01001-65	MM-L004302	4/23/99	SW8260	TETRACHLOROETHENE(PCE)	WW	N1	ND	0.288	1	µg/L	U
69PLT01001	69PLT01001-66	MM-L004702	4/25/99	SW8260	TETRACHLOROETHENE(PCE)	WW	N1	ND	0.288	1	µg/L	U
69PLT01001	69PLT01001-67	MM-L004902	4/27/99	SW8260	TETRACHLOROETHENE(PCE)	WW	N1	ND	0.288	1	µg/L	U
69PLT01001	69PLT01001-68	MM-L005102	4/29/99	SW8260	TETRACHLOROETHENE(PCE)	WW	N1	ND	0.288	1	µg/L	U
69PLT01001	69PLT01001-70	MM-L005502	5/7/99	SW8260	TETRACHLOROETHENE(PCE)	WW	N1	ND	0.288	1	µg/L	U
69PLT01001	69PLT01001-71	MM-L005702	5/14/99	SW8260	TETRACHLOROETHENE(PCE)	WW	N1	ND	0.288	1	µg/L	U
69PLT01001	69PLT01001-72	MM-L005902	5/21/99	SW8260	TETRACHLOROETHENE(PCE)	WW	N1	ND	0.288	1	µg/L	U
69PLT01001	69PLT01001-73	MM-L006702	6/2/99	SW8260	TETRACHLOROETHENE(PCE)	WW	N1	ND	0.288	1	µg/L	U
69PLT01001	69PLT01001-85	MM-L011202	8/3/99	SW8260	TETRACHLOROETHENE(PCE)	WW	N1	ND	0.288	1	µg/L	U
69PLT01001	69PLT01001-93	MM-L019202	9/7/99	SW8260	TETRACHLOROETHENE(PCE)	WW	N1	ND	0.288	1	µg/L	U
69PLT01001	69PLT01001-95	MM-L020402	10/1/99	SW8260	TETRACHLOROETHENE(PCE)	WW	N1	ND	0.288	1	µg/L	U
69PLT01001	69PLT01001-95	MM-L101102	10/29/99	SW8260	TETRACHLOROETHENE(PCE)	WW	N1	ND	0.288	1	µg/L	U
69PLT01001	69PLT01001-55	MM-L002002	4/6/99	SW8260	TOLUENE	WW	N1	ND	0.197	1	µg/L	U
69PLT01001	69PLT01001-65	MM-L004302	4/23/99	SW8260	TOLUENE	WW	N1	ND	0.197	1	µg/L	U

**Appendix D**  
**Treatment Plant Monitoring Data January - December 1999**

Location	Sample ID	Control Number	Date	Method	Analyte	Matrix	Type	Result	DL	RL	Units	Qual
69PLT01001	69PLT01001-66	MM-L004702	4/25/99	SW8260	TOLUENE	WW	N1	ND	0.197	1	µg/L	U
69PLT01001	69PLT01001-67	MM-L004902	4/27/99	SW8260	TOLUENE	WW	N1	ND	0.197	1	µg/L	U
69PLT01001	69PLT01001-68	MM-L005102	4/29/99	SW8260	TOLUENE	WW	N1	ND	0.197	1	µg/L	U
69PLT01001	69PLT01001-70	MM-L005502	5/7/99	SW8260	TOLUENE	WW	N1	ND	0.197	1	µg/L	U
69PLT01001	69PLT01001-71	MM-L005702	5/14/99	SW8260	TOLUENE	WW	N1	ND	0.197	1	µg/L	U
69PLT01001	69PLT01001-72	MM-L005902	5/21/99	SW8260	TOLUENE	WW	N1	ND	0.197	1	µg/L	U
69PLT01001	69PLT01001-73	MM-L006702	6/2/99	SW8260	TOLUENE	WW	N1	ND	0.197	1	µg/L	U
69PLT01001	69PLT01001-85	MM-L011202	8/3/99	SW8260	TOLUENE	WW	N1	ND	0.197	1	µg/L	U
69PLT01001	69PLT01001-93	MM-L019202	9/7/99	SW8260	TOLUENE	WW	N1	ND	0.197	1	µg/L	U
69PLT01001	69PLT01001-95	MM-L020402	10/1/99	SW8260	TOLUENE	WW	N1	ND	0.197	1	µg/L	U
69PLT01001	69PLT01001-95	MM-L101102	10/29/99	SW8260	TOLUENE	WW	N1	ND	0.197	1	µg/L	U
69PLT01001	69PLT01001-55	MM-L002002	4/6/99	SW8260	TRANS-1,2-DICHLOROETHENE	WW	N1	ND	0.168	1	µg/L	U
69PLT01001	69PLT01001-65	MM-L004302	4/23/99	SW8260	TRANS-1,2-DICHLOROETHENE	WW	N1	ND	0.168	1	µg/L	U
69PLT01001	69PLT01001-66	MM-L004702	4/25/99	SW8260	TRANS-1,2-DICHLOROETHENE	WW	N1	ND	0.168	1	µg/L	U
69PLT01001	69PLT01001-67	MM-L004902	4/27/99	SW8260	TRANS-1,2-DICHLOROETHENE	WW	N1	ND	0.168	1	µg/L	U
69PLT01001	69PLT01001-68	MM-L005102	4/29/99	SW8260	TRANS-1,2-DICHLOROETHENE	WW	N1	ND	0.168	1	µg/L	U
69PLT01001	69PLT01001-70	MM-L005502	5/7/99	SW8260	TRANS-1,2-DICHLOROETHENE	WW	N1	ND	0.168	1	µg/L	U
69PLT01001	69PLT01001-71	MM-L005702	5/14/99	SW8260	TRANS-1,2-DICHLOROETHENE	WW	N1	ND	0.168	1	µg/L	U
69PLT01001	69PLT01001-72	MM-L005902	5/21/99	SW8260	TRANS-1,2-DICHLOROETHENE	WW	N1	ND	0.168	1	µg/L	U
69PLT01001	69PLT01001-73	MM-L006702	6/2/99	SW8260	TRANS-1,2-DICHLOROETHENE	WW	N1	ND	0.168	1	µg/L	U
69PLT01001	69PLT01001-85	MM-L011202	8/3/99	SW8260	TRANS-1,2-DICHLOROETHENE	WW	N1	ND	0.168	1	µg/L	U
69PLT01001	69PLT01001-93	MM-L019202	9/7/99	SW8260	TRANS-1,2-DICHLOROETHENE	WW	N1	ND	0.168	1	µg/L	U
69PLT01001	69PLT01001-95	MM-L020402	10/1/99	SW8260	TRANS-1,2-DICHLOROETHENE	WW	N1	ND	0.168	1	µg/L	U
69PLT01001	69PLT01001-95	MM-L101102	10/29/99	SW8260	TRANS-1,2-DICHLOROETHENE	WW	N1	ND	0.168	1	µg/L	U
69PLT01001	69PLT01001-55	MM-L002002	4/6/99	SW8260	TRICHLOROETHENE(TCE)	WW	N1	ND	0.322	1	µg/L	U
69PLT01001	69PLT01001-65	MM-L004302	4/23/99	SW8260	TRICHLOROETHENE(TCE)	WW	N1	ND	0.322	1	µg/L	U
69PLT01001	69PLT01001-66	MM-L004702	4/25/99	SW8260	TRICHLOROETHENE(TCE)	WW	N1	ND	0.322	1	µg/L	U
69PLT01001	69PLT01001-67	MM-L004902	4/27/99	SW8260	TRICHLOROETHENE(TCE)	WW	N1	ND	0.322	1	µg/L	U
69PLT01001	69PLT01001-68	MM-L005102	4/29/99	SW8260	TRICHLOROETHENE(TCE)	WW	N1	ND	0.322	1	µg/L	U
69PLT01001	69PLT01001-70	MM-L005502	5/7/99	SW8260	TRICHLOROETHENE(TCE)	WW	N1	ND	0.322	1	µg/L	U
69PLT01001	69PLT01001-71	MM-L005702	5/14/99	SW8260	TRICHLOROETHENE(TCE)	WW	N1	ND	0.322	1	µg/L	U
69PLT01001	69PLT01001-72	MM-L005902	5/21/99	SW8260	TRICHLOROETHENE(TCE)	WW	N1	ND	0.322	1	µg/L	U
69PLT01001	69PLT01001-73	MM-L006702	6/2/99	SW8260	TRICHLOROETHENE(TCE)	WW	N1	ND	0.322	1	µg/L	U
69PLT01001	69PLT01001-85	MM-L011202	8/3/99	SW8260	TRICHLOROETHENE(TCE)	WW	N1	ND	0.322	1	µg/L	U
69PLT01001	69PLT01001-93	MM-L019202	9/7/99	SW8260	TRICHLOROETHENE(TCE)	WW	N1	ND	0.322	1	µg/L	U
69PLT01001	69PLT01001-95	MM-L020402	10/1/99	SW8260	TRICHLOROETHENE(TCE)	WW	N1	ND	0.322	1	µg/L	U
69PLT01001	69PLT01001-95	MM-L101102	10/29/99	SW8260	TRICHLOROETHENE(TCE)	WW	N1	ND	0.322	1	µg/L	U
69PLT01002	69PLT01002-50	OT-D657302	1/4/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01002	69PLT01002-51	OT-D658202	2/1/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01002	69PLT01002-52	MM-P000102	3/2/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U

**Appendix D**  
**Treatment Plant Monitoring Data January - December 1999**

Location	Sample ID	Control Number	Date	Method	Analyte	Matrix	Type	Result	DL	RL	Units	Qual
69PLT01002	69PLT01002-53	MM-P000302	4/1/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01002	69PLT01002-54	MM-L002003	4/6/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	0.037	0.005	0.01	µg/L	
69PLT01002	69PLT01002-55	MM-L002302	4/7/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	0.045	0.005	0.01	µg/L	
69PLT01002	69PLT01002-56	MM-L003503	4/16/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	0.048	0.005	0.01	µg/L	
69PLT01002	69PLT01002-58	MM-P000702	5/4/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01002	69PLT01002-70	MM-L019203	9/7/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01002	69PLT01002-71	MM-L020403	10/1/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01002	69PLT01002-71	MM-L101103	10/29/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01002	69PLT01002-	MM-L101902	11/30/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	0.049	0.005	0.01	µg/L	
69PLT01002	69PLT01002-54	MM-L002102	4/6/99	E300	BROMIDE	WW	N1	ND	0.013	0.1	mg/L	U
69PLT01002	69PLT01002-54	MM-L002102	4/6/99	E300	CHLORIDE (AS CL)	WW	N1	10	0.055	0.2	mg/L	
69PLT01002	69PLT01002-54	MM-L002102	4/6/99	E300	NITROGEN, NITRATE (AS N)	WW	N1	0.2	0.005	0.1	mg/L	
69PLT01002	69PLT01002-54	MM-L002102	4/6/99	E300	NITROGEN, NITRITE	WW	N1	ND	0.012	0.4	mg/L	U
69PLT01002	69PLT01002-54	MM-L002102	4/6/99	E300	PHOSPHORUS, TOTAL PO4 (AS P)	WW	N1	ND	0.15	0.3	mg/L	U
69PLT01002	69PLT01002-54	MM-L002102	4/6/99	E300	SULFATE (AS SO4)	WW	N1	8.6	0.052	0.2	mg/L	
69PLT01002	69PLT01002-71	MM-L101302	10/29/99	M8015D	DIESEL HYDROCARBONS	WW	N1	ND	30	100	µg/L	U
69PLT01002	69PLT01002-	MM-L102005	11/30/99	SW8015	DIESEL HYDROCARBONS	WW	N1	ND	30	100	µg/L	U
69PLT01002	69PLT01002-54	MM-L002202	4/6/99	C200.7	ALUMINUM (TOTAL)	WW	N1	ND	22	100	µg/L	UJ
69PLT01002	69PLT01002-54	MM-L002202	4/6/99	C200.7	ANTIMONY (TOTAL)	WW	N1	ND	1.9	5	µg/L	UJ
69PLT01002	69PLT01002-54	MM-L002202	4/6/99	C200.7	ARSENIC (TOTAL)	WW	N1	2.6	1.9	5	µg/L	J
69PLT01002	69PLT01002-54	MM-L002202	4/6/99	C200.7	BARIUM (TOTAL)	WW	N1	2.9	0.32	20	µg/L	J
69PLT01002	69PLT01002-54	MM-L002202	4/6/99	C200.7	BERYLLIUM (TOTAL)	WW	N1	ND	0.42	1	µg/L	U
69PLT01002	69PLT01002-54	MM-L002202	4/6/99	C200.7	CADMIUM (TOTAL)	WW	N1	ND	0.37	1	µg/L	U
69PLT01002	69PLT01002-54	MM-L002202	4/6/99	C200.7	CALCIUM (TOTAL)	WW	N1	2930	28.1	500	µg/L	
69PLT01002	69PLT01002-54	MM-L002202	4/6/99	C200.7	CHROMIUM (TOTAL)	WW	N1	ND	0.86	6.5	µg/L	U
69PLT01002	69PLT01002-54	MM-L002202	4/6/99	C200.7	COBALT (TOTAL)	WW	N1	ND	1.1	5	µg/L	U
69PLT01002	69PLT01002-54	MM-L002202	4/6/99	C200.7	COPPER (TOTAL)	WW	N1	ND	0.83	5	µg/L	UJ
69PLT01002	69PLT01002-54	MM-L002202	4/6/99	C200.7	IRON (TOTAL)	WW	N1	ND	24.8	100	µg/L	U
69PLT01002	69PLT01002-54	MM-L002202	4/6/99	C200.7	LEAD (TOTAL)	WW	N1	ND	1.1	2	µg/L	U
69PLT01002	69PLT01002-54	MM-L002202	4/6/99	C200.7	MAGNESIUM (TOTAL)	WW	N1	1430	21.8	500	µg/L	
69PLT01002	69PLT01002-54	MM-L002202	4/6/99	C200.7	MANGANESE (TOTAL)	WW	N1	8.8	0.33	10	µg/L	J
69PLT01002	69PLT01002-54	MM-L002202	4/6/99	C200.7	NICKEL (TOTAL)	WW	N1	ND	1.4	20	µg/L	U
69PLT01002	69PLT01002-54	MM-L002202	4/6/99	C200.7	POTASSIUM (TOTAL)	WW	N1	951	46.3	1500	µg/L	J
69PLT01002	69PLT01002-54	MM-L002202	4/6/99	C200.7	SELENIUM (TOTAL)	WW	N1	ND	2.7	5	µg/L	U
69PLT01002	69PLT01002-54	MM-L002202	4/6/99	C200.7	SILVER (TOTAL)	WW	N1	ND	1.3	10	µg/L	U
69PLT01002	69PLT01002-54	MM-L002202	4/6/99	C200.7	SODIUM (TOTAL)	WW	N1	8120	98.8	500	µg/L	
69PLT01002	69PLT01002-54	MM-L002202	4/6/99	C200.7	THALLIUM (TOTAL)	WW	N1	ND	2.5	10	µg/L	U
69PLT01002	69PLT01002-54	MM-L002202	4/6/99	C200.7	VANADIUM (TOTAL)	WW	N1	ND	1.6	10	µg/L	U
69PLT01002	69PLT01002-54	MM-L002202	4/6/99	C200.7	ZINC (TOTAL)	WW	N1	46.2	1.9	20	µg/L	
69PLT01002	69PLT01002-54	MM-L002202	4/6/99	C245.2	MERCURY (TOTAL)	WW	N1	ND	0.05	0.2	µg/L	U

**Appendix D**  
**Treatment Plant Monitoring Data January - December 1999**

Location	Sample ID	Control Number	Date	Method	Analyte	Matrix	Type	Result	DL	RL	Units	Qual
69PLT01002	69PLT01002-54	MM-L002004	4/6/99	SW8260	1,1,1-TRICHLOROETHANE	WW	N1	ND	0.328	1	µg/L	U
69PLT01002	69PLT01002-70	MM-L019204	9/7/99	SW8260	1,1,1-TRICHLOROETHANE	WW	N1	ND	0.328	1	µg/L	U
69PLT01002	69PLT01002-71	MM-L020404	10/1/99	SW8260	1,1,1-TRICHLOROETHANE	WW	N1	ND	0.328	1	µg/L	U
69PLT01002	69PLT01002-71	MM-L101104	10/29/99	SW8260	1,1,1-TRICHLOROETHANE	WW	N1	ND	0.328	1	µg/L	U
69PLT01002	69PLT01002-54	MM-L002004	4/6/99	SW8260	1,1-DICHLOROETHENE	WW	N1	ND	0.532	1	µg/L	U
69PLT01002	69PLT01002-70	MM-L019204	9/7/99	SW8260	1,1-DICHLOROETHENE	WW	N1	ND	0.532	1	µg/L	U
69PLT01002	69PLT01002-71	MM-L020404	10/1/99	SW8260	1,1-DICHLOROETHENE	WW	N1	ND	0.532	1	µg/L	U
69PLT01002	69PLT01002-71	MM-L101104	10/29/99	SW8260	1,1-DICHLOROETHENE	WW	N1	ND	0.532	1	µg/L	U
69PLT01002	69PLT01002-54	MM-L002004	4/6/99	SW8260	BENZENE	WW	N1	ND	0.371	1	µg/L	U
69PLT01002	69PLT01002-70	MM-L019204	9/7/99	SW8260	BENZENE	WW	N1	ND	0.371	1	µg/L	U
69PLT01002	69PLT01002-71	MM-L020404	10/1/99	SW8260	BENZENE	WW	N1	ND	0.371	1	µg/L	U
69PLT01002	69PLT01002-71	MM-L101104	10/29/99	SW8260	BENZENE	WW	N1	ND	0.371	1	µg/L	U
69PLT01002	69PLT01002-54	MM-L002004	4/6/99	SW8260	CARBON TETRACHLORIDE	WW	N1	ND	0.222	1	µg/L	U
69PLT01002	69PLT01002-70	MM-L019204	9/7/99	SW8260	CARBON TETRACHLORIDE	WW	N1	ND	0.222	1	µg/L	U
69PLT01002	69PLT01002-71	MM-L020404	10/1/99	SW8260	CARBON TETRACHLORIDE	WW	N1	ND	0.222	1	µg/L	U
69PLT01002	69PLT01002-71	MM-L101104	10/29/99	SW8260	CARBON TETRACHLORIDE	WW	N1	ND	0.222	1	µg/L	U
69PLT01002	69PLT01002-54	MM-L002004	4/6/99	SW8260	CIS-1,2-DICHLOROETHENE	WW	N1	ND	0.215	1	µg/L	U
69PLT01002	69PLT01002-70	MM-L019204	9/7/99	SW8260	CIS-1,2-DICHLOROETHENE	WW	N1	ND	0.215	1	µg/L	U
69PLT01002	69PLT01002-71	MM-L020404	10/1/99	SW8260	CIS-1,2-DICHLOROETHENE	WW	N1	ND	0.215	1	µg/L	U
69PLT01002	69PLT01002-71	MM-L101104	10/29/99	SW8260	CIS-1,2-DICHLOROETHENE	WW	N1	ND	0.215	1	µg/L	U
69PLT01002	69PLT01002-54	MM-L002004	4/6/99	SW8260	ETHYLBENZENE	WW	N1	ND	0.282	1	µg/L	U
69PLT01002	69PLT01002-70	MM-L019204	9/7/99	SW8260	ETHYLBENZENE	WW	N1	ND	0.282	1	µg/L	U
69PLT01002	69PLT01002-71	MM-L020404	10/1/99	SW8260	ETHYLBENZENE	WW	N1	ND	0.282	1	µg/L	U
69PLT01002	69PLT01002-71	MM-L101104	10/29/99	SW8260	ETHYLBENZENE	WW	N1	ND	0.282	1	µg/L	U
69PLT01002	69PLT01002-54	MM-L002004	4/6/99	SW8260	M,P-XYLENE (SUM OF ISOMERS)	WW	N1	ND	0.406	1	µg/L	U
69PLT01002	69PLT01002-70	MM-L019204	9/7/99	SW8260	M,P-XYLENE (SUM OF ISOMERS)	WW	N1	ND	0.406	1	µg/L	U
69PLT01002	69PLT01002-71	MM-L020404	10/1/99	SW8260	M,P-XYLENE (SUM OF ISOMERS)	WW	N1	ND	0.406	1	µg/L	U
69PLT01002	69PLT01002-71	MM-L101104	10/29/99	SW8260	M,P-XYLENE (SUM OF ISOMERS)	WW	N1	ND	0.406	1	µg/L	U
69PLT01002	69PLT01002-54	MM-L002004	4/6/99	SW8260	O-XYLENE (1,2-DIMETHYLBENZENE)	WW	N1	ND	0.289	1	µg/L	U
69PLT01002	69PLT01002-70	MM-L019204	9/7/99	SW8260	O-XYLENE (1,2-DIMETHYLBENZENE)	WW	N1	ND	0.289	1	µg/L	U
69PLT01002	69PLT01002-71	MM-L020404	10/1/99	SW8260	O-XYLENE (1,2-DIMETHYLBENZENE)	WW	N1	ND	0.289	1	µg/L	U
69PLT01002	69PLT01002-71	MM-L101104	10/29/99	SW8260	O-XYLENE (1,2-DIMETHYLBENZENE)	WW	N1	ND	0.289	1	µg/L	U
69PLT01002	69PLT01002-54	MM-L002004	4/6/99	SW8260	TETRACHLOROETHENE(PCE)	WW	N1	ND	0.288	1	µg/L	U
69PLT01002	69PLT01002-70	MM-L019204	9/7/99	SW8260	TETRACHLOROETHENE(PCE)	WW	N1	ND	0.288	1	µg/L	U
69PLT01002	69PLT01002-71	MM-L020404	10/1/99	SW8260	TETRACHLOROETHENE(PCE)	WW	N1	ND	0.288	1	µg/L	U
69PLT01002	69PLT01002-71	MM-L101104	10/29/99	SW8260	TETRACHLOROETHENE(PCE)	WW	N1	ND	0.288	1	µg/L	U
69PLT01002	69PLT01002-54	MM-L002004	4/6/99	SW8260	TOLUENE	WW	N1	ND	0.197	1	µg/L	U
69PLT01002	69PLT01002-70	MM-L019204	9/7/99	SW8260	TOLUENE	WW	N1	ND	0.197	1	µg/L	U
69PLT01002	69PLT01002-71	MM-L020404	10/1/99	SW8260	TOLUENE	WW	N1	ND	0.197	1	µg/L	U
69PLT01002	69PLT01002-71	MM-L101104	10/29/99	SW8260	TOLUENE	WW	N1	ND	0.197	1	µg/L	U

**Appendix D**  
**Treatment Plant Monitoring Data January - December 1999**

Location	Sample ID	Control Number	Date	Method	Analyte	Matrix	Type	Result	DL	RL	Units	Qual
69PLT01002	69PLT01002-54	MM-L002004	4/6/99	SW8260	TRANS-1,2-DICHLOROETHENE	WW	N1	ND	0.168	1	µg/L	U
69PLT01002	69PLT01002-70	MM-L019204	9/7/99	SW8260	TRANS-1,2-DICHLOROETHENE	WW	N1	ND	0.168	1	µg/L	U
69PLT01002	69PLT01002-71	MM-L020404	10/1/99	SW8260	TRANS-1,2-DICHLOROETHENE	WW	N1	ND	0.168	1	µg/L	U
69PLT01002	69PLT01002-71	MM-L101104	10/29/99	SW8260	TRANS-1,2-DICHLOROETHENE	WW	N1	ND	0.168	1	µg/L	U
69PLT01002	69PLT01002-54	MM-L002004	4/6/99	SW8260	TRICHLOROETHENE(TCE)	WW	N1	ND	0.322	1	µg/L	U
69PLT01002	69PLT01002-70	MM-L019204	9/7/99	SW8260	TRICHLOROETHENE(TCE)	WW	N1	ND	0.322	1	µg/L	U
69PLT01002	69PLT01002-71	MM-L020404	10/1/99	SW8260	TRICHLOROETHENE(TCE)	WW	N1	ND	0.322	1	µg/L	U
69PLT01002	69PLT01002-71	MM-L101104	10/29/99	SW8260	TRICHLOROETHENE(TCE)	WW	N1	ND	0.322	1	µg/L	U
69PLT01003	69PLT01003-21	MM-L004303	4/23/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01003	69PLT01003-22	MM-L004703	4/25/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01003	69PLT01003-23	MM-L004903	4/27/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01003	69PLT01003-24	MM-L005103	4/29/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01003	69PLT01003-25	MM-L005503	5/7/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01003	69PLT01003-26	MM-L005703	5/14/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01003	69PLT01003-27	MM-L005903	5/21/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01003	69PLT01003-28	MM-L006703	6/2/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01003	69PLT01003-29	MM-L008102	7/6/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01003	69PLT01003-67	MM-L011203	8/3/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	0.011	0.005	0.01	µg/L	
69PLT01003	69PLT01003-68	MM-L011402	8/9/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	0.016	0.005	0.01	µg/L	
69PLT01003	69PLT01003-86	MM-L012201	8/12/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	0.02	0.005	0.01	µg/L	
69PLT01003	69PLT01003-87	MM-L012402	8/14/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	0.015	0.005	0.01	µg/L	
69PLT01003	69PLT01003-88	MM-L012502	8/16/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	0.015	0.005	0.01	µg/L	
69PLT01003	69PLT01003-85	MM-L012602	8/17/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	0.021	0.005	0.01	µg/L	
69PLT01003	69PLT01003-90	MM-L012802	8/19/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	0.026	0.005	0.01	µg/L	
69PLT01003	69PLT01003-92	MM-L012902	8/23/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	0.025	0.005	0.01	µg/L	
69PLT01003	69PLT01003-21	MM-L004503	4/23/99	E300	BROMIDE	WW	N1	ND	0.013	0.1	mg/L	U
69PLT01003	69PLT01003-21	MM-L004503	4/23/99	E300	CHLORIDE (AS CL)	WW	N1	10.5	0.055	0.2	mg/L	
69PLT01003	69PLT01003-21	MM-L004503	4/23/99	E300	NITROGEN, NITRATE (AS N)	WW	N1	0.15	0.005	0.1	mg/L	
69PLT01003	69PLT01003-21	MM-L004503	4/23/99	E300	NITROGEN, NITRITE	WW	N1	ND	0.012	0.4	mg/L	U
69PLT01003	69PLT01003-21	MM-L004503	4/23/99	E300	PHOSPHORUS, TOTAL PO4 (AS P)	WW	N1	ND	0.15	0.3	mg/L	U
69PLT01003	69PLT01003-21	MM-L004503	4/23/99	E300	SULFATE (AS SO4)	WW	N1	7.8	0.052	0.2	mg/L	
69PLT01003	69PLT01003-21	MM-L004501	4/23/99	M8015D	DIESEL HYDROCARBONS	WW	N1	ND	14	100	µg/L	U
69PLT01003	69PLT01003-21	MM-L004502	4/23/99	M8015V	GASOLINE HYDROCARBONS	WW	N1	ND	5.2	25	µg/L	U
69PLT01003	69PLT01003-21	MM-L004602	4/23/99	C200.7	ALUMINUM (TOTAL)	WW	N1	ND	36.1	294	µg/L	U
69PLT01003	69PLT01003-21	MM-L004602	4/23/99	C200.7	ANTIMONY (TOTAL)	WW	N1	ND	10	18	µg/L	U
69PLT01003	69PLT01003-21	MM-L004602	4/23/99	C200.7	ARSENIC (TOTAL)	WW	N1	ND	1.9	5	µg/L	UJ
69PLT01003	69PLT01003-21	MM-L004602	4/23/99	C200.7	BARIUM (TOTAL)	WW	N1	ND	2.9	20	µg/L	U
69PLT01003	69PLT01003-21	MM-L004602	4/23/99	C200.7	BERYLLIUM (TOTAL)	WW	N1	ND	0.42	1	µg/L	U
69PLT01003	69PLT01003-21	MM-L004602	4/23/99	C200.7	CADMIUM (TOTAL)	WW	N1	ND	0.37	1	µg/L	U
69PLT01003	69PLT01003-21	MM-L004602	4/23/99	C200.7	CALCIUM (TOTAL)	WW	N1	3250	28.1	500	µg/L	

**Appendix D**  
**Treatment Plant Monitoring Data January - December 1999**

Location	Sample ID	Control Number	Date	Method	Analyte	Matrix	Type	Result	DL	RL	Units	Qual
69PLT01003	69PLT01003-21	MM-L004602	4/23/99	C200.7	CHROMIUM (TOTAL)	WW	N1	ND	0.62	5	µg/L	UJ
69PLT01003	69PLT01003-21	MM-L004602	4/23/99	C200.7	COBALT (TOTAL)	WW	N1	1.3	0.59	5	µg/L	J
69PLT01003	69PLT01003-21	MM-L004602	4/23/99	C200.7	COPPER (TOTAL)	WW	N1	ND	0.83	5	µg/L	UJ
69PLT01003	69PLT01003-21	MM-L004602	4/23/99	C200.7	IRON (TOTAL)	WW	N1	ND	20.7	110	µg/L	U
69PLT01003	69PLT01003-21	MM-L004602	4/23/99	C200.7	LEAD (TOTAL)	WW	N1	ND	1.1	2	µg/L	U
69PLT01003	69PLT01003-21	MM-L004602	4/23/99	C200.7	MAGNESIUM (TOTAL)	WW	N1	1650	21.8	500	µg/L	
69PLT01003	69PLT01003-21	MM-L004602	4/23/99	C200.7	MANGANESE (TOTAL)	WW	N1	ND	2.9	10	µg/L	U
69PLT01003	69PLT01003-21	MM-L004602	4/23/99	C200.7	NICKEL (TOTAL)	WW	N1	ND	1.4	20	µg/L	U
69PLT01003	69PLT01003-21	MM-L004602	4/23/99	C200.7	POTASSIUM (TOTAL)	WW	N1	ND	1240	1932	µg/L	U
69PLT01003	69PLT01003-21	MM-L004602	4/23/99	C200.7	SELENIUM (TOTAL)	WW	N1	ND	2.7	5	µg/L	U
69PLT01003	69PLT01003-21	MM-L004602	4/23/99	C200.7	SILVER (TOTAL)	WW	N1	ND	0.8	10	µg/L	UJ
69PLT01003	69PLT01003-21	MM-L004602	4/23/99	C200.7	SODIUM (TOTAL)	WW	N1	7290	98.8	500	µg/L	
69PLT01003	69PLT01003-21	MM-L004602	4/23/99	C200.7	THALLIUM (TOTAL)	WW	N1	3.3	2.5	10	µg/L	J
69PLT01003	69PLT01003-21	MM-L004602	4/23/99	C200.7	VANADIUM (TOTAL)	WW	N1	1.4	0.96	10	µg/L	J
69PLT01003	69PLT01003-21	MM-L004602	4/23/99	C200.7	ZINC (TOTAL)	WW	N1	41.3	1.9	20	µg/L	
69PLT01003	69PLT01003-21	MM-L004602	4/23/99	C245.2	MERCURY (TOTAL)	WW	N1	ND	0.05	0.2	µg/L	U
69PLT01003	69PLT01003-21	MM-L004304	4/23/99	SW8260	1,1,1-TRICHLOROETHANE	WW	N1	ND	0.328	1	µg/L	U
69PLT01003	69PLT01003-22	MM-L004704	4/25/99	SW8260	1,1,1-TRICHLOROETHANE	WW	N1	ND	0.328	1	µg/L	U
69PLT01003	69PLT01003-23	MM-L004904	4/27/99	SW8260	1,1,1-TRICHLOROETHANE	WW	N1	ND	0.328	1	µg/L	U
69PLT01003	69PLT01003-24	MM-L005104	4/29/99	SW8260	1,1,1-TRICHLOROETHANE	WW	N1	ND	0.328	1	µg/L	U
69PLT01003	69PLT01003-25	MM-L005504	5/7/99	SW8260	1,1,1-TRICHLOROETHANE	WW	N1	ND	0.328	1	µg/L	U
69PLT01003	69PLT01003-26	MM-L005704	5/14/99	SW8260	1,1,1-TRICHLOROETHANE	WW	N1	ND	0.328	1	µg/L	U
69PLT01003	69PLT01003-27	MM-L005904	5/21/99	SW8260	1,1,1-TRICHLOROETHANE	WW	N1	ND	0.328	1	µg/L	U
69PLT01003	69PLT01003-28	MM-L006704	6/2/99	SW8260	1,1,1-TRICHLOROETHANE	WW	N1	ND	0.328	1	µg/L	U
69PLT01003	69PLT01003-67	MM-L011204	8/3/99	SW8260	1,1,1-TRICHLOROETHANE	WW	N1	ND	0.328	1	µg/L	U
69PLT01003	69PLT01003-21	MM-L004304	4/23/99	SW8260	1,1-DICHLOROETHENE	WW	N1	ND	0.532	1	µg/L	U
69PLT01003	69PLT01003-22	MM-L004704	4/25/99	SW8260	1,1-DICHLOROETHENE	WW	N1	ND	0.532	1	µg/L	U
69PLT01003	69PLT01003-23	MM-L004904	4/27/99	SW8260	1,1-DICHLOROETHENE	WW	N1	ND	0.532	1	µg/L	U
69PLT01003	69PLT01003-24	MM-L005104	4/29/99	SW8260	1,1-DICHLOROETHENE	WW	N1	ND	0.532	1	µg/L	U
69PLT01003	69PLT01003-25	MM-L005504	5/7/99	SW8260	1,1-DICHLOROETHENE	WW	N1	ND	0.532	1	µg/L	U
69PLT01003	69PLT01003-26	MM-L005704	5/14/99	SW8260	1,1-DICHLOROETHENE	WW	N1	ND	0.532	1	µg/L	U
69PLT01003	69PLT01003-27	MM-L005904	5/21/99	SW8260	1,1-DICHLOROETHENE	WW	N1	ND	0.532	1	µg/L	U
69PLT01003	69PLT01003-28	MM-L006704	6/2/99	SW8260	1,1-DICHLOROETHENE	WW	N1	ND	0.532	1	µg/L	U
69PLT01003	69PLT01003-67	MM-L011204	8/3/99	SW8260	1,1-DICHLOROETHENE	WW	N1	ND	0.532	1	µg/L	U
69PLT01003	69PLT01003-21	MM-L004304	4/23/99	SW8260	BENZENE	WW	N1	ND	0.371	1	µg/L	U
69PLT01003	69PLT01003-22	MM-L004704	4/25/99	SW8260	BENZENE	WW	N1	ND	0.371	1	µg/L	U
69PLT01003	69PLT01003-23	MM-L004904	4/27/99	SW8260	BENZENE	WW	N1	ND	0.371	1	µg/L	U
69PLT01003	69PLT01003-24	MM-L005104	4/29/99	SW8260	BENZENE	WW	N1	ND	0.371	1	µg/L	U
69PLT01003	69PLT01003-25	MM-L005504	5/7/99	SW8260	BENZENE	WW	N1	ND	0.371	1	µg/L	U
69PLT01003	69PLT01003-26	MM-L005704	5/14/99	SW8260	BENZENE	WW	N1	ND	0.371	1	µg/L	U

**Appendix D**  
**Treatment Plant Monitoring Data January - December 1999**

Location	Sample ID	Control Number	Date	Method	Analyte	Matrix	Type	Result	DL	RL	Units	Qual
69PLT01003	69PLT01003-27	MM-L005904	5/21/99	SW8260	BENZENE	WW	N1	ND	0.371	1	µg/L	U
69PLT01003	69PLT01003-28	MM-L006704	6/2/99	SW8260	BENZENE	WW	N1	ND	0.371	1	µg/L	U
69PLT01003	69PLT01003-67	MM-L011204	8/3/99	SW8260	BENZENE	WW	N1	ND	0.371	1	µg/L	U
69PLT01003	69PLT01003-21	MM-L004304	4/23/99	SW8260	CARBON TETRACHLORIDE	WW	N1	ND	0.222	1	µg/L	U
69PLT01003	69PLT01003-22	MM-L004704	4/25/99	SW8260	CARBON TETRACHLORIDE	WW	N1	ND	0.222	1	µg/L	U
69PLT01003	69PLT01003-23	MM-L004904	4/27/99	SW8260	CARBON TETRACHLORIDE	WW	N1	ND	0.222	1	µg/L	U
69PLT01003	69PLT01003-24	MM-L005104	4/29/99	SW8260	CARBON TETRACHLORIDE	WW	N1	ND	0.222	1	µg/L	U
69PLT01003	69PLT01003-25	MM-L005504	5/7/99	SW8260	CARBON TETRACHLORIDE	WW	N1	ND	0.222	1	µg/L	U
69PLT01003	69PLT01003-26	MM-L005704	5/14/99	SW8260	CARBON TETRACHLORIDE	WW	N1	ND	0.222	1	µg/L	U
69PLT01003	69PLT01003-27	MM-L005904	5/21/99	SW8260	CARBON TETRACHLORIDE	WW	N1	ND	0.222	1	µg/L	U
69PLT01003	69PLT01003-28	MM-L006704	6/2/99	SW8260	CARBON TETRACHLORIDE	WW	N1	ND	0.222	1	µg/L	U
69PLT01003	69PLT01003-67	MM-L011204	8/3/99	SW8260	CARBON TETRACHLORIDE	WW	N1	ND	0.222	1	µg/L	U
69PLT01003	69PLT01003-21	MM-L004304	4/23/99	SW8260	CIS-1,2-DICHLOROETHENE	WW	N1	ND	0.215	1	µg/L	U
69PLT01003	69PLT01003-22	MM-L004704	4/25/99	SW8260	CIS-1,2-DICHLOROETHENE	WW	N1	ND	0.215	1	µg/L	U
69PLT01003	69PLT01003-23	MM-L004904	4/27/99	SW8260	CIS-1,2-DICHLOROETHENE	WW	N1	ND	0.215	1	µg/L	U
69PLT01003	69PLT01003-24	MM-L005104	4/29/99	SW8260	CIS-1,2-DICHLOROETHENE	WW	N1	ND	0.215	1	µg/L	U
69PLT01003	69PLT01003-25	MM-L005504	5/7/99	SW8260	CIS-1,2-DICHLOROETHENE	WW	N1	ND	0.215	1	µg/L	U
69PLT01003	69PLT01003-26	MM-L005704	5/14/99	SW8260	CIS-1,2-DICHLOROETHENE	WW	N1	ND	0.215	1	µg/L	U
69PLT01003	69PLT01003-27	MM-L005904	5/21/99	SW8260	CIS-1,2-DICHLOROETHENE	WW	N1	ND	0.215	1	µg/L	U
69PLT01003	69PLT01003-28	MM-L006704	6/2/99	SW8260	CIS-1,2-DICHLOROETHENE	WW	N1	ND	0.215	1	µg/L	U
69PLT01003	69PLT01003-67	MM-L011204	8/3/99	SW8260	CIS-1,2-DICHLOROETHENE	WW	N1	ND	0.215	1	µg/L	U
69PLT01003	69PLT01003-21	MM-L004304	4/23/99	SW8260	ETHYLBENZENE	WW	N1	ND	0.282	1	µg/L	U
69PLT01003	69PLT01003-22	MM-L004704	4/25/99	SW8260	ETHYLBENZENE	WW	N1	ND	0.282	1	µg/L	U
69PLT01003	69PLT01003-23	MM-L004904	4/27/99	SW8260	ETHYLBENZENE	WW	N1	ND	0.282	1	µg/L	U
69PLT01003	69PLT01003-24	MM-L005104	4/29/99	SW8260	ETHYLBENZENE	WW	N1	ND	0.282	1	µg/L	U
69PLT01003	69PLT01003-25	MM-L005504	5/7/99	SW8260	ETHYLBENZENE	WW	N1	ND	0.282	1	µg/L	U
69PLT01003	69PLT01003-26	MM-L005704	5/14/99	SW8260	ETHYLBENZENE	WW	N1	ND	0.282	1	µg/L	U
69PLT01003	69PLT01003-27	MM-L005904	5/21/99	SW8260	ETHYLBENZENE	WW	N1	ND	0.282	1	µg/L	U
69PLT01003	69PLT01003-28	MM-L006704	6/2/99	SW8260	ETHYLBENZENE	WW	N1	ND	0.282	1	µg/L	U
69PLT01003	69PLT01003-67	MM-L011204	8/3/99	SW8260	ETHYLBENZENE	WW	N1	ND	0.282	1	µg/L	U
69PLT01003	69PLT01003-21	MM-L004304	4/23/99	SW8260	M,P-XYLENE (SUM OF ISOMERS)	WW	N1	ND	0.406	1	µg/L	U
69PLT01003	69PLT01003-22	MM-L004704	4/25/99	SW8260	M,P-XYLENE (SUM OF ISOMERS)	WW	N1	ND	0.406	1	µg/L	U
69PLT01003	69PLT01003-23	MM-L004904	4/27/99	SW8260	M,P-XYLENE (SUM OF ISOMERS)	WW	N1	ND	0.406	1	µg/L	U
69PLT01003	69PLT01003-24	MM-L005104	4/29/99	SW8260	M,P-XYLENE (SUM OF ISOMERS)	WW	N1	ND	0.406	1	µg/L	U
69PLT01003	69PLT01003-25	MM-L005504	5/7/99	SW8260	M,P-XYLENE (SUM OF ISOMERS)	WW	N1	ND	0.406	1	µg/L	U
69PLT01003	69PLT01003-26	MM-L005704	5/14/99	SW8260	M,P-XYLENE (SUM OF ISOMERS)	WW	N1	ND	0.406	1	µg/L	U
69PLT01003	69PLT01003-27	MM-L005904	5/21/99	SW8260	M,P-XYLENE (SUM OF ISOMERS)	WW	N1	ND	0.406	1	µg/L	U
69PLT01003	69PLT01003-28	MM-L006704	6/2/99	SW8260	M,P-XYLENE (SUM OF ISOMERS)	WW	N1	ND	0.406	2	µg/L	U
69PLT01003	69PLT01003-67	MM-L011204	8/3/99	SW8260	M,P-XYLENE (SUM OF ISOMERS)	WW	N1	ND	0.406	2	µg/L	U
69PLT01003	69PLT01003-21	MM-L004304	4/23/99	SW8260	O-XYLENE (1,2-DIMETHYLBENZENE)	WW	N1	ND	0.289	1	µg/L	U

**Appendix D**  
**Treatment Plant Monitoring Data January - December 1999**

Location	Sample ID	Control Number	Date	Method	Analyte	Matrix	Type	Result	DL	RL	Units	Qual
69PLT01003	69PLT01003-22	MM-L004704	4/25/99	SW8260	O-XYLENE (1,2-DIMETHYLBENZENE)	WW	N1	ND	0.289	1	µg/L	U
69PLT01003	69PLT01003-23	MM-L004904	4/27/99	SW8260	O-XYLENE (1,2-DIMETHYLBENZENE)	WW	N1	ND	0.289	1	µg/L	U
69PLT01003	69PLT01003-24	MM-L005104	4/29/99	SW8260	O-XYLENE (1,2-DIMETHYLBENZENE)	WW	N1	ND	0.289	1	µg/L	U
69PLT01003	69PLT01003-25	MM-L005504	5/7/99	SW8260	O-XYLENE (1,2-DIMETHYLBENZENE)	WW	N1	ND	0.289	1	µg/L	U
69PLT01003	69PLT01003-26	MM-L005704	5/14/99	SW8260	O-XYLENE (1,2-DIMETHYLBENZENE)	WW	N1	ND	0.289	1	µg/L	U
69PLT01003	69PLT01003-27	MM-L005904	5/21/99	SW8260	O-XYLENE (1,2-DIMETHYLBENZENE)	WW	N1	ND	0.289	1	µg/L	U
69PLT01003	69PLT01003-28	MM-L006704	6/2/99	SW8260	O-XYLENE (1,2-DIMETHYLBENZENE)	WW	N1	ND	0.289	1	µg/L	U
69PLT01003	69PLT01003-67	MM-L011204	8/3/99	SW8260	O-XYLENE (1,2-DIMETHYLBENZENE)	WW	N1	ND	0.289	1	µg/L	U
69PLT01003	69PLT01003-21	MM-L004304	4/23/99	SW8260	TETRACHLOROETHENE(PCE)	WW	N1	ND	0.288	1	µg/L	U
69PLT01003	69PLT01003-22	MM-L004704	4/25/99	SW8260	TETRACHLOROETHENE(PCE)	WW	N1	ND	0.288	1	µg/L	U
69PLT01003	69PLT01003-23	MM-L004904	4/27/99	SW8260	TETRACHLOROETHENE(PCE)	WW	N1	ND	0.288	1	µg/L	U
69PLT01003	69PLT01003-24	MM-L005104	4/29/99	SW8260	TETRACHLOROETHENE(PCE)	WW	N1	ND	0.288	1	µg/L	U
69PLT01003	69PLT01003-25	MM-L005504	5/7/99	SW8260	TETRACHLOROETHENE(PCE)	WW	N1	ND	0.288	1	µg/L	U
69PLT01003	69PLT01003-26	MM-L005704	5/14/99	SW8260	TETRACHLOROETHENE(PCE)	WW	N1	ND	0.288	1	µg/L	U
69PLT01003	69PLT01003-27	MM-L005904	5/21/99	SW8260	TETRACHLOROETHENE(PCE)	WW	N1	ND	0.288	1	µg/L	U
69PLT01003	69PLT01003-28	MM-L006704	6/2/99	SW8260	TETRACHLOROETHENE(PCE)	WW	N1	ND	0.288	1	µg/L	U
69PLT01003	69PLT01003-67	MM-L011204	8/3/99	SW8260	TETRACHLOROETHENE(PCE)	WW	N1	ND	0.288	1	µg/L	U
69PLT01003	69PLT01003-21	MM-L004304	4/23/99	SW8260	TOLUENE	WW	N1	ND	0.197	1	µg/L	U
69PLT01003	69PLT01003-22	MM-L004704	4/25/99	SW8260	TOLUENE	WW	N1	ND	0.197	1	µg/L	U
69PLT01003	69PLT01003-23	MM-L004904	4/27/99	SW8260	TOLUENE	WW	N1	ND	0.197	1	µg/L	U
69PLT01003	69PLT01003-24	MM-L005104	4/29/99	SW8260	TOLUENE	WW	N1	ND	0.197	1	µg/L	U
69PLT01003	69PLT01003-25	MM-L005504	5/7/99	SW8260	TOLUENE	WW	N1	ND	0.197	1	µg/L	U
69PLT01003	69PLT01003-26	MM-L005704	5/14/99	SW8260	TOLUENE	WW	N1	ND	0.197	1	µg/L	U
69PLT01003	69PLT01003-27	MM-L005904	5/21/99	SW8260	TOLUENE	WW	N1	ND	0.197	1	µg/L	U
69PLT01003	69PLT01003-28	MM-L006704	6/2/99	SW8260	TOLUENE	WW	N1	ND	0.197	1	µg/L	U
69PLT01003	69PLT01003-67	MM-L011204	8/3/99	SW8260	TOLUENE	WW	N1	ND	0.197	1	µg/L	U
69PLT01003	69PLT01003-21	MM-L004304	4/23/99	SW8260	TRANS-1,2-DICHLOROETHENE	WW	N1	ND	0.168	1	µg/L	U
69PLT01003	69PLT01003-22	MM-L004704	4/25/99	SW8260	TRANS-1,2-DICHLOROETHENE	WW	N1	ND	0.168	1	µg/L	U
69PLT01003	69PLT01003-23	MM-L004904	4/27/99	SW8260	TRANS-1,2-DICHLOROETHENE	WW	N1	ND	0.168	1	µg/L	U
69PLT01003	69PLT01003-24	MM-L005104	4/29/99	SW8260	TRANS-1,2-DICHLOROETHENE	WW	N1	ND	0.168	1	µg/L	U
69PLT01003	69PLT01003-25	MM-L005504	5/7/99	SW8260	TRANS-1,2-DICHLOROETHENE	WW	N1	ND	0.168	1	µg/L	U
69PLT01003	69PLT01003-26	MM-L005704	5/14/99	SW8260	TRANS-1,2-DICHLOROETHENE	WW	N1	ND	0.168	1	µg/L	U
69PLT01003	69PLT01003-27	MM-L005904	5/21/99	SW8260	TRANS-1,2-DICHLOROETHENE	WW	N1	ND	0.168	1	µg/L	U
69PLT01003	69PLT01003-28	MM-L006704	6/2/99	SW8260	TRANS-1,2-DICHLOROETHENE	WW	N1	ND	0.168	1	µg/L	U
69PLT01003	69PLT01003-67	MM-L011204	8/3/99	SW8260	TRANS-1,2-DICHLOROETHENE	WW	N1	ND	0.168	1	µg/L	U
69PLT01003	69PLT01003-21	MM-L004304	4/23/99	SW8260	TRICHLOROETHENE(TCE)	WW	N1	ND	0.322	1	µg/L	U
69PLT01003	69PLT01003-22	MM-L004704	4/25/99	SW8260	TRICHLOROETHENE(TCE)	WW	N1	ND	0.322	1	µg/L	U
69PLT01003	69PLT01003-23	MM-L004904	4/27/99	SW8260	TRICHLOROETHENE(TCE)	WW	N1	ND	0.322	1	µg/L	U
69PLT01003	69PLT01003-24	MM-L005104	4/29/99	SW8260	TRICHLOROETHENE(TCE)	WW	N1	ND	0.322	1	µg/L	U
69PLT01003	69PLT01003-25	MM-L005504	5/7/99	SW8260	TRICHLOROETHENE(TCE)	WW	N1	ND	0.322	1	µg/L	U

**Appendix D**  
**Treatment Plant Monitoring Data January - December 1999**

Location	Sample ID	Control Number	Date	Method	Analyte	Matrix	Type	Result	DL	RL	Units	Qual
69PLT01003	69PLT01003-26	MM-L005704	5/14/99	SW8260	TRICHLOROETHENE(TCE)	WW	N1	ND	0.322	1	µg/L	U
69PLT01003	69PLT01003-27	MM-L005904	5/21/99	SW8260	TRICHLOROETHENE(TCE)	WW	N1	ND	0.322	1	µg/L	U
69PLT01003	69PLT01003-28	MM-L006704	6/2/99	SW8260	TRICHLOROETHENE(TCE)	WW	N1	ND	0.322	1	µg/L	U
69PLT01003	69PLT01003-67	MM-L011204	8/3/99	SW8260	TRICHLOROETHENE(TCE)	WW	N1	ND	0.322	1	µg/L	U
69PLT01004	69PLT01004-07	MM-F020401	4/1/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01005	69PLT01005-05	MM-F020402	4/1/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01006	69PLT01006-05	MM-F020403	4/1/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01006	69PLT01006-06	MM-L002303	4/7/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01010	69PLT01010-34	OT-D657303	1/4/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01010	69PLT01010-37	OT-D658203	2/1/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01010	69PLT01010-38	MM-P000103	3/2/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01010	69PLT01010-39	MM-P000303	4/1/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01010	69PLT01010-40	MM-L002005	4/6/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01010	69PLT01010-41	MM-L002304	4/7/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01010	69PLT01010-42	MM-L002402	4/9/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01010	69PLT01010-43	MM-L002502	4/11/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01010	69PLT01010-44	MM-L003402	4/14/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01010	69PLT01010-45	MM-L003502	4/16/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01010	69PLT01010-47	MM-L003702	4/18/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01010	69PLT01010-51	MM-P000703	5/4/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01010	69PLT01010-54	MM-L005905	5/21/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01010	69PLT01010-55	MM-L006705	6/2/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01010	69PLT01010-56	MM-L008103	7/6/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01010	69PLT01010-68	MM-L011205	8/3/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01010	69PLT01010-70	MM-L011403	8/9/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01010	69PLT01010-86	MM-L012301	8/12/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01010	69PLT01010-87	MM-L012403	8/14/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01010	69PLT01010-88	MM-L012503	8/16/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01010	69PLT01010-85	MM-L012603	8/17/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01010	69PLT01010-90	MM-L012803	8/19/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01010	69PLT01010-92	MM-L012903	8/23/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01010	69PLT01010-92	MM-L019205	9/7/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01010	69PLT01010-94	MM-L020405	10/1/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01010	69PLT01010-94	MM-L101105	10/29/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01010	69PLT01010-	MM-L101903	11/30/99	E504	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.005	0.01	µg/L	U
69PLT01010	69PLT01010-36	OT-D658101	1/15/99	E160.1	TOTAL DISSOLVED SOLIDS	WW	N1	-	-	-	mg/L	R
69PLT01010	69PLT01010-39	MM-P000502	4/1/99	E160.1	TOTAL DISSOLVED SOLIDS	WW	N1	44	4.4	10	mg/L	
69PLT01010	69PLT01010-51	MM-P000808	5/4/99	E160.1	TOTAL DISSOLVED SOLIDS	WW	N1	52	4.4	10	mg/L	
69PLT01010	69PLT01010-56	MM-L008204	7/6/99	E160.1	TOTAL DISSOLVED SOLIDS	WW	N1	23	3.9	10	mg/L	
69PLT01010	69PLT01010-94	MM-L020605	10/1/99	E160.1	TOTAL DISSOLVED SOLIDS	WW	N1	36	3.9	10	mg/L	

**Appendix D**  
**Treatment Plant Monitoring Data January - December 1999**

Location	Sample ID	Control Number	Date	Method	Analyte	Matrix	Type	Result	DL	RL	Units	Qual
69PLT01010	69PLT01010-36	OT-D658101	1/15/99	E160.2	SUSPENDED SOLIDS (RESIDUE, NON-FILT	WW	N1	37	3.6	4	mg/L	
69PLT01010	69PLT01010-39	MM-P000502	4/1/99	E160.2	SUSPENDED SOLIDS (RESIDUE, NON-FILT	WW	N1	4	3.6	4	mg/L	
69PLT01010	69PLT01010-51	MM-P000808	5/4/99	E160.2	SUSPENDED SOLIDS (RESIDUE, NON-FILT	WW	N1	ND	3.6	4	mg/L	U
69PLT01010	69PLT01010-56	MM-L008204	7/6/99	E160.2	SUSPENDED SOLIDS (RESIDUE, NON-FILT	WW	N1	6	3.6	4	mg/L	
69PLT01010	69PLT01010-94	MM-L020605	10/1/99	E160.2	SUSPENDED SOLIDS (RESIDUE, NON-FILT	WW	N1	ND	3.6	4	mg/L	U
69PLT01010	69PLT01010-36	OT-D658101	1/15/99	E300	BROMIDE	WW	N1	0.025	0.013	0.1	mg/L	J
69PLT01010	69PLT01010-39	MM-P000502	4/1/99	E300	BROMIDE	WW	N1	0.013	0.013	0.1	mg/L	J
69PLT01010	69PLT01010-40	MM-L002103	4/6/99	E300	BROMIDE	WW	N1	ND	0.013	0.1	mg/L	U
69PLT01010	69PLT01010-50	MM-L004504	4/23/99	E300	BROMIDE	WW	N1	ND	0.013	0.1	mg/L	U
69PLT01010	69PLT01010-51	MM-P000808	5/4/99	E300	BROMIDE	WW	N1	0.04	0.013	0.1	mg/L	J
69PLT01010	69PLT01010-56	MM-L008204	7/6/99	E300	BROMIDE	WW	N1	ND	0.013	0.1	mg/L	U
69PLT01010	69PLT01010-68	MM-L011304	8/3/99	E300	BROMIDE	WW	N1	ND	0.013	0.1	mg/L	U
69PLT01010	69PLT01010-93	MM-L019304	9/7/99	E300	BROMIDE	WW	N1	ND	0.013	0.1	mg/L	U
69PLT01010	69PLT01010-94	MM-L020605	10/1/99	E300	BROMIDE	WW	N1	ND	0.013	0.1	mg/L	U
69PLT01010	69PLT01010-94	MM-L101204	10/29/99	E300	BROMIDE	WW	N1	0.03	0.013	0.1	mg/L	J
69PLT01010	69PLT01010-	MM-L102006	11/30/99	E300	BROMIDE	WW	N1	0.03	0.013	0.1	mg/L	J
69PLT01010	69PLT01010-36	OT-D658101	1/15/99	E300	CHLORIDE (AS CL)	WW	N1	10.9	0.055	0.2	mg/L	
69PLT01010	69PLT01010-39	MM-P000502	4/1/99	E300	CHLORIDE (AS CL)	WW	N1	11.8	0.055	0.2	mg/L	
69PLT01010	69PLT01010-40	MM-L002103	4/6/99	E300	CHLORIDE (AS CL)	WW	N1	10.8	0.055	0.2	mg/L	
69PLT01010	69PLT01010-50	MM-L004504	4/23/99	E300	CHLORIDE (AS CL)	WW	N1	10.7	0.055	0.2	mg/L	
69PLT01010	69PLT01010-51	MM-P000808	5/4/99	E300	CHLORIDE (AS CL)	WW	N1	9.7	0.055	0.2	mg/L	
69PLT01010	69PLT01010-56	MM-L008204	7/6/99	E300	CHLORIDE (AS CL)	WW	N1	10.6	0.056	0.2	mg/L	
69PLT01010	69PLT01010-68	MM-L011304	8/3/99	E300	CHLORIDE (AS CL)	WW	N1	10.7	0.056	0.2	mg/L	
69PLT01010	69PLT01010-93	MM-L019304	9/7/99	E300	CHLORIDE (AS CL)	WW	N1	11.1	0.056	0.2	mg/L	
69PLT01010	69PLT01010-94	MM-L020605	10/1/99	E300	CHLORIDE (AS CL)	WW	N1	10.2	0.056	0.2	mg/L	
69PLT01010	69PLT01010-94	MM-L101204	10/29/99	E300	CHLORIDE (AS CL)	WW	N1	9.6	0.056	0.2	mg/L	
69PLT01010	69PLT01010-	MM-L102006	11/30/99	E300	CHLORIDE (AS CL)	WW	N1	10.5	0.056	0.2	mg/L	
69PLT01010	69PLT01010-39	MM-P000502	4/1/99	E300	NITROGEN, NITRATE (AS N)	WW	N1	0.17	0.005	0.1	mg/L	
69PLT01010	69PLT01010-40	MM-L002103	4/6/99	E300	NITROGEN, NITRATE (AS N)	WW	N1	0.19	0.005	0.1	mg/L	
69PLT01010	69PLT01010-50	MM-L004504	4/23/99	E300	NITROGEN, NITRATE (AS N)	WW	N1	ND	0.005	0.1	mg/L	U
69PLT01010	69PLT01010-51	MM-P000808	5/4/99	E300	NITROGEN, NITRATE (AS N)	WW	N1	0.12	0.005	0.1	mg/L	
69PLT01010	69PLT01010-56	MM-L008204	7/6/99	E300	NITROGEN, NITRATE (AS N)	WW	N1	0.21	0.0061	0.1	mg/L	
69PLT01010	69PLT01010-68	MM-L011304	8/3/99	E300	NITROGEN, NITRATE (AS N)	WW	N1	0.23	0.0061	0.1	mg/L	
69PLT01010	69PLT01010-93	MM-L019304	9/7/99	E300	NITROGEN, NITRATE (AS N)	WW	N1	0.19	0.0061	0.1	mg/L	
69PLT01010	69PLT01010-94	MM-L020605	10/1/99	E300	NITROGEN, NITRATE (AS N)	WW	N1	0.18	0.0061	0.1	mg/L	
69PLT01010	69PLT01010-94	MM-L101204	10/29/99	E300	NITROGEN, NITRATE (AS N)	WW	N1	0.24	0.0061	0.1	mg/L	
69PLT01010	69PLT01010-	MM-L102006	11/30/99	E300	NITROGEN, NITRATE (AS N)	WW	N1	0.25	0.0061	0.1	mg/L	
69PLT01010	69PLT01010-39	MM-P000502	4/1/99	E300	NITROGEN, NITRITE	WW	N1	ND	0.012	0.4	mg/L	U
69PLT01010	69PLT01010-40	MM-L002103	4/6/99	E300	NITROGEN, NITRITE	WW	N1	ND	0.012	0.4	mg/L	U
69PLT01010	69PLT01010-50	MM-L004504	4/23/99	E300	NITROGEN, NITRITE	WW	N1	ND	0.012	0.4	mg/L	U

**Appendix D**  
**Treatment Plant Monitoring Data January - December 1999**

Location	Sample ID	Control Number	Date	Method	Analyte	Matrix	Type	Result	DL	RL	Units	Qual
69PLT01010	69PLT01010-51	MM-P000808	5/4/99	E300	NITROGEN, NITRITE	WW	N1	ND	0.012	0.4	mg/L	U
69PLT01010	69PLT01010-56	MM-L008204	7/6/99	E300	NITROGEN, NITRITE	WW	N1	ND	0.0091	0.4	mg/L	U
69PLT01010	69PLT01010-68	MM-L011304	8/3/99	E300	NITROGEN, NITRITE	WW	N1	ND	0.0091	0.4	mg/L	U
69PLT01010	69PLT01010-93	MM-L019304	9/7/99	E300	NITROGEN, NITRITE	WW	N1	ND	0.0091	0.4	mg/L	U
69PLT01010	69PLT01010-94	MM-L020605	10/1/99	E300	NITROGEN, NITRITE	WW	N1	ND	0.0091	0.4	mg/L	U
69PLT01010	69PLT01010-94	MM-L101204	10/29/99	E300	NITROGEN, NITRITE	WW	N1	ND	0.0091	0.4	mg/L	U
69PLT01010	69PLT01010-	MM-L102006	11/30/99	E300	NITROGEN, NITRITE	WW	N1	ND	0.0091	0.4	mg/L	U
69PLT01010	69PLT01010-39	MM-P000502	4/1/99	E300	PHOSPHORUS, TOTAL PO4 (AS P)	WW	N1	ND	0.15	0.3	mg/L	U
69PLT01010	69PLT01010-40	MM-L002103	4/6/99	E300	PHOSPHORUS, TOTAL PO4 (AS P)	WW	N1	ND	0.15	0.3	mg/L	U
69PLT01010	69PLT01010-50	MM-L004504	4/23/99	E300	PHOSPHORUS, TOTAL PO4 (AS P)	WW	N1	ND	0.15	0.3	mg/L	U
69PLT01010	69PLT01010-51	MM-P000808	5/4/99	E300	PHOSPHORUS, TOTAL PO4 (AS P)	WW	N1	ND	0.15	0.3	mg/L	U
69PLT01010	69PLT01010-56	MM-L008204	7/6/99	E300	PHOSPHORUS, TOTAL PO4 (AS P)	WW	N1	ND	0.05	0.34	mg/L	U
69PLT01010	69PLT01010-68	MM-L011304	8/3/99	E300	PHOSPHORUS, TOTAL PO4 (AS P)	WW	N1	ND	0.026	0.3	mg/L	U
69PLT01010	69PLT01010-93	MM-L019304	9/7/99	E300	PHOSPHORUS, TOTAL PO4 (AS P)	WW	N1	ND	0.026	0.3	mg/L	U
69PLT01010	69PLT01010-94	MM-L020605	10/1/99	E300	PHOSPHORUS, TOTAL PO4 (AS P)	WW	N1	ND	0.026	0.3	mg/L	U
69PLT01010	69PLT01010-94	MM-L101204	10/29/99	E300	PHOSPHORUS, TOTAL PO4 (AS P)	WW	N1	ND	0.026	0.3	mg/L	U
69PLT01010	69PLT01010-	MM-L102006	11/30/99	E300	PHOSPHORUS, TOTAL PO4 (AS P)	WW	N1	0.07	0.026	0.3	mg/L	J
69PLT01010	69PLT01010-36	OT-D658101	1/15/99	E300	SULFATE (AS SO4)	WW	N1	8.1	0.052	0.2	mg/L	
69PLT01010	69PLT01010-39	MM-P000502	4/1/99	E300	SULFATE (AS SO4)	WW	N1	8.9	0.052	0.2	mg/L	
69PLT01010	69PLT01010-40	MM-L002103	4/6/99	E300	SULFATE (AS SO4)	WW	N1	8.1	0.052	0.2	mg/L	
69PLT01010	69PLT01010-50	MM-L004504	4/23/99	E300	SULFATE (AS SO4)	WW	N1	4.6	0.052	0.2	mg/L	
69PLT01010	69PLT01010-51	MM-P000808	5/4/99	E300	SULFATE (AS SO4)	WW	N1	7.3	0.052	0.2	mg/L	
69PLT01010	69PLT01010-56	MM-L008204	7/6/99	E300	SULFATE (AS SO4)	WW	N1	8.1	0.027	0.2	mg/L	
69PLT01010	69PLT01010-68	MM-L011304	8/3/99	E300	SULFATE (AS SO4)	WW	N1	8	0.027	0.2	mg/L	
69PLT01010	69PLT01010-93	MM-L019304	9/7/99	E300	SULFATE (AS SO4)	WW	N1	8.1	0.027	0.2	mg/L	
69PLT01010	69PLT01010-94	MM-L020605	10/1/99	E300	SULFATE (AS SO4)	WW	N1	7.8	0.027	0.2	mg/L	
69PLT01010	69PLT01010-94	MM-L101204	10/29/99	E300	SULFATE (AS SO4)	WW	N1	8.5	0.027	0.2	mg/L	
69PLT01010	69PLT01010-	MM-L102006	11/30/99	E300	SULFATE (AS SO4)	WW	N1	8.3	0.1	0.2	mg/L	
69PLT01010	69PLT01010-36	OT-D658101	1/15/99	E310.1	ALKALINITY, TOTAL (AS CaCO3)	WW	N1	10.1	5	10	mg/L	
69PLT01010	69PLT01010-39	MM-P000502	4/1/99	E310.1	ALKALINITY, TOTAL (AS CaCO3)	WW	N1	10.1	5	10	mg/L	
69PLT01010	69PLT01010-51	MM-P000808	5/4/99	E310.1	ALKALINITY, TOTAL (AS CaCO3)	WW	N1	13.1	5	10	mg/L	
69PLT01010	69PLT01010-56	MM-L008204	7/6/99	E310.1	ALKALINITY, TOTAL (AS CaCO3)	WW	N1	12.1	5	10	mg/L	
69PLT01010	69PLT01010-68	MM-L011305	8/3/99	E310.1	ALKALINITY, TOTAL (AS CaCO3)	WW	N1	12.1	5	10	mg/L	
69PLT01010	69PLT01010-93	MM-L019304	9/7/99	E310.1	ALKALINITY, TOTAL (AS CaCO3)	WW	N1	12.1	5	10	mg/L	
69PLT01010	69PLT01010-94	MM-L020605	10/1/99	E310.1	ALKALINITY, TOTAL (AS CaCO3)	WW	N1	11.1	5	10	mg/L	
69PLT01010	69PLT01010-94	MM-L101204	10/29/99	E310.1	ALKALINITY, TOTAL (AS CaCO3)	WW	N1	16.2	5	10	mg/L	
69PLT01010	69PLT01010-	MM-L102006	11/30/99	E310.1	ALKALINITY, TOTAL (AS CaCO3)	WW	N1	14.1	5	10	mg/L	
69PLT01010	69PLT01010-36	OT-D658101	1/15/99	E353.2	NITROGEN, NITRATE (AS N)	WW	N1	0.2	0.015	0.1	mg/L	
69PLT01010	69PLT01010-36	OT-D658101	1/15/99	E353.2	NITROGEN, NITRITE	WW	N1	ND	0.014	0.1	mg/L	U
69PLT01010	69PLT01010-36	OT-D658101	1/15/99	E365.1	PHOSPHORUS, TOTAL PO4 (AS P)	WW	N1	ND	0.013	0.08	mg/L	U

**Appendix D**  
**Treatment Plant Monitoring Data January - December 1999**

Location	Sample ID	Control Number	Date	Method	Analyte	Matrix	Type	Result	DL	RL	Units	Qual
69PLT01010	69PLT01010-36	OT-D658103	1/15/99	E405.1	BIOLOGIC OXYGEN DEMAND, FIVE DAY	WW	N1	ND	3	3	mg/L	U
69PLT01010	69PLT01010-39	MM-P000503	4/1/99	E405.1	BIOLOGIC OXYGEN DEMAND, FIVE DAY	WW	N1	ND	3	3	mg/L	U
69PLT01010	69PLT01010-51	MM-P000804	5/4/99	E405.1	BIOLOGIC OXYGEN DEMAND, FIVE DAY	WW	N1	ND	3	3	mg/L	U
69PLT01010	69PLT01010-56	MM-L008205	7/6/99	E405.1	BIOLOGIC OXYGEN DEMAND, FIVE DAY	WW	N1	ND	3	3	mg/L	U
69PLT01010	69PLT01010-94	MM-L020605	10/1/99	E405.1	BIOLOGIC OXYGEN DEMAND, FIVE DAY	WW	N1	ND	3	3	mg/L	U
69PLT01010	69PLT01010-36	OT-D658102	1/15/99	E410.1	COD - CHEMICAL OXYGEN DEMAND	WW	N1	ND	20	20	mg/L	U
69PLT01010	69PLT01010-39	MM-P000504	4/1/99	E410.1	COD - CHEMICAL OXYGEN DEMAND	WW	N1	ND	20	20	mg/L	U
69PLT01010	69PLT01010-51	MM-P000805	5/4/99	E410.1	COD - CHEMICAL OXYGEN DEMAND	WW	N1	ND	20	20	mg/L	U
69PLT01010	69PLT01010-56	MM-L008206	7/6/99	E410.1	COD - CHEMICAL OXYGEN DEMAND	WW	N1	ND	20	20	mg/L	U
69PLT01010	69PLT01010-94	MM-L020608	10/1/99	E410.1	COD - CHEMICAL OXYGEN DEMAND	WW	N1	ND	20	20	mg/L	U
69PLT01010	69PLT01010-35	OT-D657409	1/4/99	E415.1	DISSOLVED ORGANIC CARBON	WW	N1	ND	0.2	1	mg/L	U
69PLT01010	69PLT01010-37	OT-D658304	2/1/99	E415.1	DISSOLVED ORGANIC CARBON	WW	N1	ND	0.2	1	mg/L	U
69PLT01010	69PLT01010-38	MM-P000203	3/2/99	E415.1	DISSOLVED ORGANIC CARBON	WW	N1	1.1	0.2	1	mg/L	
69PLT01010	69PLT01010-39	MM-P000505	4/1/99	E415.1	DISSOLVED ORGANIC CARBON	WW	N1	2	0.2	1	mg/L	
69PLT01010	69PLT01010-51	MM-P000807	5/4/99	E415.1	DISSOLVED ORGANIC CARBON	WW	N1	1.5	0.2	1	mg/L	
69PLT01010	69PLT01010-56	MM-L008208	7/6/99	E415.1	DISSOLVED ORGANIC CARBON	WW	N1	0.2	0.2	1	mg/L	J
69PLT01010	69PLT01010-68	MM-L011306	8/3/99	E415.1	DISSOLVED ORGANIC CARBON	WW	N1	ND	0.2	1	mg/L	U
69PLT01010	69PLT01010-93	MM-L019306	9/7/99	E415.1	DISSOLVED ORGANIC CARBON	WW	N1	0.21	0.2	1	mg/L	J
69PLT01010	69PLT01010-94	MM-L020606	10/1/99	E415.1	DISSOLVED ORGANIC CARBON	WW	N1	ND	0.2	1	mg/L	U
69PLT01010	69PLT01010-94	MM-L101205	10/29/99	E415.1	DISSOLVED ORGANIC CARBON	WW	N1	1	0.2	1	mg/L	
69PLT01010	69PLT01010-	MM-L102007	11/30/99	E415.1	DISSOLVED ORGANIC CARBON	WW	N1	ND	0.2	1	mg/L	U
69PLT01010	69PLT01010-35	OT-D657408	1/4/99	E415.1	TOTAL ORGANIC CARBON	WW	N1	ND	0.2	1	mg/L	U
69PLT01010	69PLT01010-37	OT-D658303	2/1/99	E415.1	TOTAL ORGANIC CARBON	WW	N1	ND	0.2	1	mg/L	U
69PLT01010	69PLT01010-38	MM-P000204	3/2/99	E415.1	TOTAL ORGANIC CARBON	WW	N1	ND	0.2	1	mg/L	U
69PLT01010	69PLT01010-39	MM-P000506	4/1/99	E415.1	TOTAL ORGANIC CARBON	WW	N1	0.26	0.2	1	mg/L	J
69PLT01010	69PLT01010-51	MM-P000806	5/4/99	E415.1	TOTAL ORGANIC CARBON	WW	N1	0.28	0.2	1	mg/L	J
69PLT01010	69PLT01010-56	MM-L008207	7/6/99	E415.1	TOTAL ORGANIC CARBON	WW	N1	ND	0.2	1	mg/L	U
69PLT01010	69PLT01010-68	MM-L011306	8/3/99	E415.1	TOTAL ORGANIC CARBON	WW	N1	ND	0.2	1	mg/L	U
69PLT01010	69PLT01010-93	MM-L019305	9/7/99	E415.1	TOTAL ORGANIC CARBON	WW	N1	ND	0.2	1	mg/L	U
69PLT01010	69PLT01010-94	MM-L020607	10/1/99	E415.1	TOTAL ORGANIC CARBON	WW	N1	ND	0.2	1	mg/L	U
69PLT01010	69PLT01010-94	MM-L101206	10/29/99	E415.1	TOTAL ORGANIC CARBON	WW	N1	ND	0.2	1	mg/L	U
69PLT01010	69PLT01010-	MM-L102008	11/30/99	E415.1	TOTAL ORGANIC CARBON	WW	N1	ND	0.2	1	mg/L	U
69PLT01010	69PLT01010-39	MM-P000602	4/1/99	C200.7	ALUMINUM (TOTAL)	WW	N1	ND	22	100	µg/L	U
69PLT01010	69PLT01010-40	MM-L002203	4/6/99	C200.7	ALUMINUM (TOTAL)	WW	N1	ND	22	100	µg/L	UJ
69PLT01010	69PLT01010-50	MM-L004603	4/23/99	C200.7	ALUMINUM (TOTAL)	WW	N1	ND	22	100	µg/L	U
69PLT01010	69PLT01010-51	MM-P001002	5/4/99	C200.7	ALUMINUM (TOTAL)	WW	N1	ND	21.7	294	µg/L	U
69PLT01010	69PLT01010-56	MM-L008302	7/6/99	C200.7	ALUMINUM (TOTAL)	WW	N1	ND	21.7	200	µg/L	U
69PLT01010	69PLT01010-94	MM-L020702	10/1/99	C200.7	ALUMINUM (TOTAL)	WW	N1	ND	47.4	200	µg/L	U
69PLT01010	69PLT01010-39	MM-P000602	4/1/99	C200.7	ANTIMONY (TOTAL)	WW	N1	2.6	1.9	5	µg/L	J
69PLT01010	69PLT01010-40	MM-L002203	4/6/99	C200.7	ANTIMONY (TOTAL)	WW	N1	ND	1.9	5	µg/L	UJ

**Appendix D**  
**Treatment Plant Monitoring Data January - December 1999**

Location	Sample ID	Control Number	Date	Method	Analyte	Matrix	Type	Result	DL	RL	Units	Qual
69PLT01010	69PLT01010-50	MM-L004603	4/23/99	C200.7	ANTIMONY (TOTAL)	WW	N1	ND	1.9	5	µg/L	U
69PLT01010	69PLT01010-51	MM-P001002	5/4/99	C200.7	ANTIMONY (TOTAL)	WW	N1	ND	4.3	5	µg/L	UJ
69PLT01010	69PLT01010-56	MM-L008302	7/6/99	C200.7	ANTIMONY (TOTAL)	WW	N1	ND	4.3	5	µg/L	U
69PLT01010	69PLT01010-94	MM-L020702	10/1/99	C200.7	ANTIMONY (TOTAL)	WW	N1	ND	5.7	10	µg/L	U
69PLT01010	69PLT01010-39	MM-P000602	4/1/99	C200.7	ARSENIC (TOTAL)	WW	N1	ND	1.9	5	µg/L	U
69PLT01010	69PLT01010-40	MM-L002203	4/6/99	C200.7	ARSENIC (TOTAL)	WW	N1	ND	1.9	5	µg/L	U
69PLT01010	69PLT01010-50	MM-L004603	4/23/99	C200.7	ARSENIC (TOTAL)	WW	N1	ND	1.9	5	µg/L	UJ
69PLT01010	69PLT01010-51	MM-P001002	5/4/99	C200.7	ARSENIC (TOTAL)	WW	N1	ND	2.1	5	µg/L	U
69PLT01010	69PLT01010-56	MM-L008302	7/6/99	C200.7	ARSENIC (TOTAL)	WW	N1	ND	2.1	5	µg/L	U
69PLT01010	69PLT01010-94	MM-L020702	10/1/99	C200.7	ARSENIC (TOTAL)	WW	N1	ND	3.3	5	µg/L	U
69PLT01010	69PLT01010-39	MM-P000602	4/1/99	C200.7	BARIUM (TOTAL)	WW	N1	3.6	0.32	20	µg/L	J
69PLT01010	69PLT01010-40	MM-L002203	4/6/99	C200.7	BARIUM (TOTAL)	WW	N1	3	0.32	20	µg/L	J
69PLT01010	69PLT01010-50	MM-L004603	4/23/99	C200.7	BARIUM (TOTAL)	WW	N1	8.4	0.32	20	µg/L	J
69PLT01010	69PLT01010-51	MM-P001002	5/4/99	C200.7	BARIUM (TOTAL)	WW	N1	ND	2.9	20	µg/L	U
69PLT01010	69PLT01010-56	MM-L008302	7/6/99	C200.7	BARIUM (TOTAL)	WW	N1	ND	3.1	20	µg/L	U
69PLT01010	69PLT01010-94	MM-L020702	10/1/99	C200.7	BARIUM (TOTAL)	WW	N1	3.4	0.58	20	µg/L	J
69PLT01010	69PLT01010-39	MM-P000602	4/1/99	C200.7	BERYLLIUM (TOTAL)	WW	N1	ND	0.42	1	µg/L	U
69PLT01010	69PLT01010-40	MM-L002203	4/6/99	C200.7	BERYLLIUM (TOTAL)	WW	N1	ND	0.42	1	µg/L	U
69PLT01010	69PLT01010-50	MM-L004603	4/23/99	C200.7	BERYLLIUM (TOTAL)	WW	N1	ND	0.42	1	µg/L	U
69PLT01010	69PLT01010-51	MM-P001002	5/4/99	C200.7	BERYLLIUM (TOTAL)	WW	N1	ND	0.14	1	µg/L	U
69PLT01010	69PLT01010-56	MM-L008302	7/6/99	C200.7	BERYLLIUM (TOTAL)	WW	N1	ND	0.14	1	µg/L	U
69PLT01010	69PLT01010-94	MM-L020702	10/1/99	C200.7	BERYLLIUM (TOTAL)	WW	N1	ND	0.26	1	µg/L	U
69PLT01010	69PLT01010-39	MM-P000602	4/1/99	C200.7	CADMIUM (TOTAL)	WW	N1	ND	0.37	1	µg/L	U
69PLT01010	69PLT01010-40	MM-L002203	4/6/99	C200.7	CADMIUM (TOTAL)	WW	N1	ND	0.37	1	µg/L	U
69PLT01010	69PLT01010-50	MM-L004603	4/23/99	C200.7	CADMIUM (TOTAL)	WW	N1	ND	0.37	1	µg/L	U
69PLT01010	69PLT01010-51	MM-P001002	5/4/99	C200.7	CADMIUM (TOTAL)	WW	N1	ND	0.33	1	µg/L	U
69PLT01010	69PLT01010-56	MM-L008302	7/6/99	C200.7	CADMIUM (TOTAL)	WW	N1	ND	0.33	1	µg/L	U
69PLT01010	69PLT01010-94	MM-L020702	10/1/99	C200.7	CADMIUM (TOTAL)	WW	N1	ND	0.49	1	µg/L	U
69PLT01010	69PLT01010-39	MM-P000602	4/1/99	C200.7	CALCIUM (TOTAL)	WW	N1	3200	28.1	500	µg/L	
69PLT01010	69PLT01010-40	MM-L002203	4/6/99	C200.7	CALCIUM (TOTAL)	WW	N1	2920	28.1	500	µg/L	
69PLT01010	69PLT01010-50	MM-L004603	4/23/99	C200.7	CALCIUM (TOTAL)	WW	N1	3540	28.1	500	µg/L	
69PLT01010	69PLT01010-51	MM-P001002	5/4/99	C200.7	CALCIUM (TOTAL)	WW	N1	3320	37.7	500	µg/L	
69PLT01010	69PLT01010-56	MM-L008302	7/6/99	C200.7	CALCIUM (TOTAL)	WW	N1	3140	37.7	500	µg/L	
69PLT01010	69PLT01010-94	MM-L020702	10/1/99	C200.7	CALCIUM (TOTAL)	WW	N1	3290	61.4	500	µg/L	
69PLT01010	69PLT01010-39	MM-P000602	4/1/99	C200.7	CHROMIUM (TOTAL)	WW	N1	ND	0.62	5	µg/L	UJ
69PLT01010	69PLT01010-40	MM-L002203	4/6/99	C200.7	CHROMIUM (TOTAL)	WW	N1	ND	1.1	6.5	µg/L	U
69PLT01010	69PLT01010-50	MM-L004603	4/23/99	C200.7	CHROMIUM (TOTAL)	WW	N1	ND	0.62	5	µg/L	UJ
69PLT01010	69PLT01010-51	MM-P001002	5/4/99	C200.7	CHROMIUM (TOTAL)	WW	N1	ND	1.2	5	µg/L	U
69PLT01010	69PLT01010-56	MM-L008302	7/6/99	C200.7	CHROMIUM (TOTAL)	WW	N1	ND	1.2	5	µg/L	U
69PLT01010	69PLT01010-94	MM-L020702	10/1/99	C200.7	CHROMIUM (TOTAL)	WW	N1	ND	1.2	5	µg/L	UJ

**Appendix D**  
**Treatment Plant Monitoring Data January - December 1999**

Location	Sample ID	Control Number	Date	Method	Analyte	Matrix	Type	Result	DL	RL	Units	Qual
69PLT01010	69PLT01010-39	MM-P000602	4/1/99	C200.7	COBALT (TOTAL)	WW	N1	ND	0.59	5	µg/L	UJ
69PLT01010	69PLT01010-40	MM-L002203	4/6/99	C200.7	COBALT (TOTAL)	WW	N1	ND	0.59	5	µg/L	U
69PLT01010	69PLT01010-50	MM-L004603	4/23/99	C200.7	COBALT (TOTAL)	WW	N1	ND	0.59	5	µg/L	U
69PLT01010	69PLT01010-51	MM-P001002	5/4/99	C200.7	COBALT (TOTAL)	WW	N1	ND	0.87	5	µg/L	U
69PLT01010	69PLT01010-56	MM-L008302	7/6/99	C200.7	COBALT (TOTAL)	WW	N1	ND	0.87	5	µg/L	U
69PLT01010	69PLT01010-94	MM-L020702	10/1/99	C200.7	COBALT (TOTAL)	WW	N1	ND	1.2	5	µg/L	U
69PLT01010	69PLT01010-39	MM-P000602	4/1/99	C200.7	COPPER (TOTAL)	WW	N1	0.93	0.83	5	µg/L	J
69PLT01010	69PLT01010-40	MM-L002203	4/6/99	C200.7	COPPER (TOTAL)	WW	N1	ND	0.83	5	µg/L	UJ
69PLT01010	69PLT01010-50	MM-L004603	4/23/99	C200.7	COPPER (TOTAL)	WW	N1	ND	0.83	5	µg/L	UJ
69PLT01010	69PLT01010-51	MM-P001002	5/4/99	C200.7	COPPER (TOTAL)	WW	N1	ND	1.2	5	µg/L	UJ
69PLT01010	69PLT01010-56	MM-L008302	7/6/99	C200.7	COPPER (TOTAL)	WW	N1	ND	1.2	5	µg/L	UJ
69PLT01010	69PLT01010-94	MM-L020702	10/1/99	C200.7	COPPER (TOTAL)	WW	N1	ND	1.3	5	µg/L	UJ
69PLT01010	69PLT01010-39	MM-P000602	4/1/99	C200.7	IRON (TOTAL)	WW	N1	ND	15.6	100	µg/L	UJ
69PLT01010	69PLT01010-40	MM-L002203	4/6/99	C200.7	IRON (TOTAL)	WW	N1	110	15.6	100	µg/L	
69PLT01010	69PLT01010-50	MM-L004603	4/23/99	C200.7	IRON (TOTAL)	WW	N1	ND	15.6	100	µg/L	U
69PLT01010	69PLT01010-51	MM-P001002	5/4/99	C200.7	IRON (TOTAL)	WW	N1	ND	20.1	100	µg/L	U
69PLT01010	69PLT01010-56	MM-L008302	7/6/99	C200.7	IRON (TOTAL)	WW	N1	ND	20.1	100	µg/L	UJ
69PLT01010	69PLT01010-94	MM-L020702	10/1/99	C200.7	IRON (TOTAL)	WW	N1	98.1	33.6	100	µg/L	J
69PLT01010	69PLT01010-39	MM-P000602	4/1/99	C200.7	LEAD (TOTAL)	WW	N1	ND	1.1	2	µg/L	U
69PLT01010	69PLT01010-40	MM-L002203	4/6/99	C200.7	LEAD (TOTAL)	WW	N1	ND	1.1	2	µg/L	U
69PLT01010	69PLT01010-50	MM-L004603	4/23/99	C200.7	LEAD (TOTAL)	WW	N1	ND	1.1	2	µg/L	U
69PLT01010	69PLT01010-51	MM-P001002	5/4/99	C200.7	LEAD (TOTAL)	WW	N1	ND	1.1	2	µg/L	U
69PLT01010	69PLT01010-56	MM-L008302	7/6/99	C200.7	LEAD (TOTAL)	WW	N1	ND	1.1	2	µg/L	U
69PLT01010	69PLT01010-94	MM-L020702	10/1/99	C200.7	LEAD (TOTAL)	WW	N1	ND	1.7	2	µg/L	U
69PLT01010	69PLT01010-39	MM-P000602	4/1/99	C200.7	MAGNESIUM (TOTAL)	WW	N1	1640	21.8	500	µg/L	
69PLT01010	69PLT01010-40	MM-L002203	4/6/99	C200.7	MAGNESIUM (TOTAL)	WW	N1	1440	21.8	500	µg/L	
69PLT01010	69PLT01010-50	MM-L004603	4/23/99	C200.7	MAGNESIUM (TOTAL)	WW	N1	1670	21.8	500	µg/L	
69PLT01010	69PLT01010-51	MM-P001002	5/4/99	C200.7	MAGNESIUM (TOTAL)	WW	N1	1640	21.1	500	µg/L	
69PLT01010	69PLT01010-56	MM-L008302	7/6/99	C200.7	MAGNESIUM (TOTAL)	WW	N1	1540	21.1	500	µg/L	
69PLT01010	69PLT01010-94	MM-L020702	10/1/99	C200.7	MAGNESIUM (TOTAL)	WW	N1	1620	52.8	500	µg/L	
69PLT01010	69PLT01010-39	MM-P000602	4/1/99	C200.7	MANGANESE (TOTAL)	WW	N1	4.5	0.33	10	µg/L	J
69PLT01010	69PLT01010-40	MM-L002203	4/6/99	C200.7	MANGANESE (TOTAL)	WW	N1	5.9	0.33	10	µg/L	J
69PLT01010	69PLT01010-50	MM-L004603	4/23/99	C200.7	MANGANESE (TOTAL)	WW	N1	21.5	0.33	10	µg/L	
69PLT01010	69PLT01010-51	MM-P001002	5/4/99	C200.7	MANGANESE (TOTAL)	WW	N1	7.1	0.42	10	µg/L	J
69PLT01010	69PLT01010-56	MM-L008302	7/6/99	C200.7	MANGANESE (TOTAL)	WW	N1	3.9	0.42	10	µg/L	J
69PLT01010	69PLT01010-94	MM-L020702	10/1/99	C200.7	MANGANESE (TOTAL)	WW	N1	5.6	0.42	10	µg/L	J
69PLT01010	69PLT01010-39	MM-P000602	4/1/99	C200.7	NICKEL (TOTAL)	WW	N1	ND	1.4	20	µg/L	U
69PLT01010	69PLT01010-40	MM-L002203	4/6/99	C200.7	NICKEL (TOTAL)	WW	N1	ND	1.4	20	µg/L	U
69PLT01010	69PLT01010-50	MM-L004603	4/23/99	C200.7	NICKEL (TOTAL)	WW	N1	ND	1.4	20	µg/L	U
69PLT01010	69PLT01010-51	MM-P001002	5/4/99	C200.7	NICKEL (TOTAL)	WW	N1	ND	1.9	20	µg/L	U

**Appendix D**  
**Treatment Plant Monitoring Data January - December 1999**

Location	Sample ID	Control Number	Date	Method	Analyte	Matrix	Type	Result	DL	RL	Units	Qual
69PLT01010	69PLT01010-56	MM-L008302	7/6/99	C200.7	NICKEL (TOTAL)	WW	N1	ND	1.9	20	µg/L	U
69PLT01010	69PLT01010-94	MM-L020702	10/1/99	C200.7	NICKEL (TOTAL)	WW	N1	ND	1.8	20	µg/L	U
69PLT01010	69PLT01010-39	MM-P000602	4/1/99	C200.7	POTASSIUM (TOTAL)	WW	N1	784	46.3	1500	µg/L	J
69PLT01010	69PLT01010-40	MM-L002203	4/6/99	C200.7	POTASSIUM (TOTAL)	WW	N1	856	46.3	1500	µg/L	J
69PLT01010	69PLT01010-50	MM-L004603	4/23/99	C200.7	POTASSIUM (TOTAL)	WW	N1	ND	1150	1932	µg/L	U
69PLT01010	69PLT01010-51	MM-P001002	5/4/99	C200.7	POTASSIUM (TOTAL)	WW	N1	1140	112	1500	µg/L	J
69PLT01010	69PLT01010-56	MM-L008302	7/6/99	C200.7	POTASSIUM (TOTAL)	WW	N1	905	112	1500	µg/L	J
69PLT01010	69PLT01010-94	MM-L020702	10/1/99	C200.7	POTASSIUM (TOTAL)	WW	N1	815	158	1500	µg/L	J
69PLT01010	69PLT01010-39	MM-P000602	4/1/99	C200.7	SELENIUM (TOTAL)	WW	N1	ND	2.7	5	µg/L	U
69PLT01010	69PLT01010-40	MM-L002203	4/6/99	C200.7	SELENIUM (TOTAL)	WW	N1	ND	2.7	5	µg/L	U
69PLT01010	69PLT01010-50	MM-L004603	4/23/99	C200.7	SELENIUM (TOTAL)	WW	N1	ND	2.7	5	µg/L	U
69PLT01010	69PLT01010-51	MM-P001002	5/4/99	C200.7	SELENIUM (TOTAL)	WW	N1	ND	2.7	5	µg/L	U
69PLT01010	69PLT01010-56	MM-L008302	7/6/99	C200.7	SELENIUM (TOTAL)	WW	N1	ND	2.7	5	µg/L	U
69PLT01010	69PLT01010-94	MM-L020702	10/1/99	C200.7	SELENIUM (TOTAL)	WW	N1	ND	3.8	5	µg/L	U
69PLT01010	69PLT01010-39	MM-P000602	4/1/99	C200.7	SILVER (TOTAL)	WW	N1	ND	0.8	10	µg/L	UJ
69PLT01010	69PLT01010-40	MM-L002203	4/6/99	C200.7	SILVER (TOTAL)	WW	N1	ND	1.5	10	µg/L	U
69PLT01010	69PLT01010-50	MM-L004603	4/23/99	C200.7	SILVER (TOTAL)	WW	N1	ND	0.8	10	µg/L	UJ
69PLT01010	69PLT01010-51	MM-P001002	5/4/99	C200.7	SILVER (TOTAL)	WW	N1	ND	1.7	10	µg/L	U
69PLT01010	69PLT01010-56	MM-L008302	7/6/99	C200.7	SILVER (TOTAL)	WW	N1	ND	1.7	10	µg/L	U
69PLT01010	69PLT01010-94	MM-L020702	10/1/99	C200.7	SILVER (TOTAL)	WW	N1	ND	1.9	10	µg/L	U
69PLT01010	69PLT01010-39	MM-P000602	4/1/99	C200.7	SODIUM (TOTAL)	WW	N1	7550	98.8	500	µg/L	
69PLT01010	69PLT01010-40	MM-L002203	4/6/99	C200.7	SODIUM (TOTAL)	WW	N1	8510	98.8	500	µg/L	
69PLT01010	69PLT01010-50	MM-L004603	4/23/99	C200.7	SODIUM (TOTAL)	WW	N1	7720	98.8	500	µg/L	
69PLT01010	69PLT01010-51	MM-P001002	5/4/99	C200.7	SODIUM (TOTAL)	WW	N1	7320	357	500	µg/L	
69PLT01010	69PLT01010-56	MM-L008302	7/6/99	C200.7	SODIUM (TOTAL)	WW	N1	8030	357	1500	µg/L	
69PLT01010	69PLT01010-94	MM-L020702	10/1/99	C200.7	SODIUM (TOTAL)	WW	N1	8320	465	1500	µg/L	
69PLT01010	69PLT01010-39	MM-P000602	4/1/99	C200.7	THALLIUM (TOTAL)	WW	N1	ND	2.5	10	µg/L	U
69PLT01010	69PLT01010-40	MM-L002203	4/6/99	C200.7	THALLIUM (TOTAL)	WW	N1	ND	2.5	10	µg/L	U
69PLT01010	69PLT01010-50	MM-L004603	4/23/99	C200.7	THALLIUM (TOTAL)	WW	N1	ND	2.5	10	µg/L	U
69PLT01010	69PLT01010-51	MM-P001002	5/4/99	C200.7	THALLIUM (TOTAL)	WW	N1	ND	3.8	10	µg/L	U
69PLT01010	69PLT01010-56	MM-L008302	7/6/99	C200.7	THALLIUM (TOTAL)	WW	N1	ND	4.2	34	µg/L	U
69PLT01010	69PLT01010-94	MM-L020702	10/1/99	C200.7	THALLIUM (TOTAL)	WW	N1	ND	4.3	10	µg/L	U
69PLT01010	69PLT01010-39	MM-P000602	4/1/99	C200.7	VANADIUM (TOTAL)	WW	N1	ND	0.96	10	µg/L	U
69PLT01010	69PLT01010-40	MM-L002203	4/6/99	C200.7	VANADIUM (TOTAL)	WW	N1	ND	0.96	10	µg/L	U
69PLT01010	69PLT01010-50	MM-L004603	4/23/99	C200.7	VANADIUM (TOTAL)	WW	N1	ND	0.96	10	µg/L	U
69PLT01010	69PLT01010-51	MM-P001002	5/4/99	C200.7	VANADIUM (TOTAL)	WW	N1	ND	1.1	10	µg/L	U
69PLT01010	69PLT01010-56	MM-L008302	7/6/99	C200.7	VANADIUM (TOTAL)	WW	N1	ND	1.1	10	µg/L	U
69PLT01010	69PLT01010-94	MM-L020702	10/1/99	C200.7	VANADIUM (TOTAL)	WW	N1	ND	1.4	10	µg/L	U
69PLT01010	69PLT01010-39	MM-P000602	4/1/99	C200.7	ZINC (TOTAL)	WW	N1	ND	65.8	70	µg/L	U
69PLT01010	69PLT01010-40	MM-L002203	4/6/99	C200.7	ZINC (TOTAL)	WW	N1	53.8	1.9	20	µg/L	

**Appendix D**  
**Treatment Plant Monitoring Data January - December 1999**

Location	Sample ID	Control Number	Date	Method	Analyte	Matrix	Type	Result	DL	RL	Units	Qual
69PLT01010	69PLT01010-50	MM-L004603	4/23/99	C200.7	ZINC (TOTAL)	WW	N1	43	1.9	20	µg/L	
69PLT01010	69PLT01010-51	MM-P001002	5/4/99	C200.7	ZINC (TOTAL)	WW	N1	62.2	3.7	20	µg/L	
69PLT01010	69PLT01010-56	MM-L008302	7/6/99	C200.7	ZINC (TOTAL)	WW	N1	37.6	3.7	20	µg/L	
69PLT01010	69PLT01010-94	MM-L020702	10/1/99	C200.7	ZINC (TOTAL)	WW	N1	154	1.9	20	µg/L	
69PLT01010	69PLT01010-39	MM-P000602	4/1/99	C245.2	MERCURY (TOTAL)	WW	N1	ND	0.088	0.475	µg/L	U
69PLT01010	69PLT01010-40	MM-L002203	4/6/99	C245.2	MERCURY (TOTAL)	WW	N1	ND	0.05	0.2	µg/L	U
69PLT01010	69PLT01010-50	MM-L004603	4/23/99	C245.2	MERCURY (TOTAL)	WW	N1	ND	0.05	0.2	µg/L	U
69PLT01010	69PLT01010-51	MM-P001002	5/4/99	C245.2	MERCURY (TOTAL)	WW	N1	ND	0.05	0.2	µg/L	U
69PLT01010	69PLT01010-56	MM-L008302	7/6/99	C245.2	MERCURY (TOTAL)	WW	N1	ND	0.05	0.2	µg/L	UJ
69PLT01010	69PLT01010-94	MM-L020702	10/1/99	C245.2	MERCURY (TOTAL)	WW	N1	ND	0.05	0.2	µg/L	U
69PLT01010	69PLT01010-36	OT-D658001	1/15/99	E200.9	LEAD (TOTAL)	WW	N1	0.001	0.001	0.01	mg/L	
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	1,1,1-TRICHLOROETHANE	WW	N1	ND	0.21	1	µg/L	U
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	1,1,1-TRICHLOROETHANE	WW	N1	ND	0.21	1	µg/L	U
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	1,1,1-TRICHLOROETHANE	WW	N1	ND	0.21	1	µg/L	U
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	1,1,1-TRICHLOROETHANE	WW	N1	ND	0.094	1	µg/L	U
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	1,1,1-TRICHLOROETHANE	WW	N1	ND	0.094	1	µg/L	U
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	1,1,1-TRICHLOROETHANE	WW	N1	ND	0.094	1	µg/L	U
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	1,1,2,2-TETRACHLOROETHANE	WW	N1	ND	0.18	1	µg/L	U
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	1,1,2,2-TETRACHLOROETHANE	WW	N1	ND	0.18	1	µg/L	U
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	1,1,2,2-TETRACHLOROETHANE	WW	N1	ND	0.18	1	µg/L	U
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	1,1,2,2-TETRACHLOROETHANE	WW	N1	ND	0.14	1	µg/L	U
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	1,1,2,2-TETRACHLOROETHANE	WW	N1	ND	0.14	1	µg/L	U
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	1,1,2,2-TETRACHLOROETHANE	WW	N1	ND	0.14	1	µg/L	U
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	1,1,2-TRICHLOROETHANE	WW	N1	ND	0.23	1	µg/L	U
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	1,1,2-TRICHLOROETHANE	WW	N1	ND	0.23	1	µg/L	U
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	1,1,2-TRICHLOROETHANE	WW	N1	ND	0.23	1	µg/L	U
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	1,1,2-TRICHLOROETHANE	WW	N1	ND	0.098	1	µg/L	U
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	1,1,2-TRICHLOROETHANE	WW	N1	ND	0.098	1	µg/L	U
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	1,1,2-TRICHLOROETHANE	WW	N1	ND	0.098	1	µg/L	U
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	1,1-DICHLOROETHANE	WW	N1	ND	0.19	1	µg/L	U
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	1,1-DICHLOROETHANE	WW	N1	ND	0.19	1	µg/L	U
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	1,1-DICHLOROETHANE	WW	N1	ND	0.19	1	µg/L	U
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	1,1-DICHLOROETHANE	WW	N1	ND	0.13	1	µg/L	U
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	1,1-DICHLOROETHANE	WW	N1	ND	0.13	1	µg/L	U
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	1,1-DICHLOROETHANE	WW	N1	ND	0.13	1	µg/L	U
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	1,1-DICHLOROETHENE	WW	N1	ND	0.21	1	µg/L	U
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	1,1-DICHLOROETHENE	WW	N1	ND	0.21	1	µg/L	U
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	1,1-DICHLOROETHENE	WW	N1	ND	0.21	1	µg/L	U
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	1,1-DICHLOROETHENE	WW	N1	ND	0.13	1	µg/L	U
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	1,1-DICHLOROETHENE	WW	N1	ND	0.13	1	µg/L	U

**Appendix D**  
**Treatment Plant Monitoring Data January - December 1999**

Location	Sample ID	Control Number	Date	Method	Analyte	Matrix	Type	Result	DL	RL	Units	Qual
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	1,1-DICHLOROETHENE	WW	N1	ND	0.13	1	µg/L	U
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	1,2,4-TRICHLOROENZENE	WW	N1	ND	0.31	1	µg/L	U
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	1,2,4-TRICHLOROENZENE	WW	N1	ND	0.31	1	µg/L	U
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	1,2,4-TRICHLOROENZENE	WW	N1	ND	0.31	1	µg/L	U
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	1,2,4-TRICHLOROENZENE	WW	N1	ND	0.083	1	µg/L	U
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	1,2,4-TRICHLOROENZENE	WW	N1	ND	0.083	1	µg/L	U
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	1,2,4-TRICHLOROENZENE	WW	N1	ND	0.083	1	µg/L	U
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	1,2-DIBROMO-3-CHLOROPROPANE	WW	N1	-	-	-	µg/L	R
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	1,2-DIBROMO-3-CHLOROPROPANE	WW	N1	-	-	-	µg/L	R
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	1,2-DIBROMO-3-CHLOROPROPANE	WW	N1	-	-	-	µg/L	R
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	1,2-DIBROMO-3-CHLOROPROPANE	WW	N1	-	-	-	µg/L	R
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	1,2-DIBROMO-3-CHLOROPROPANE	WW	N1	-	-	-	µg/L	R
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	1,2-DIBROMO-3-CHLOROPROPANE	WW	N1	-	-	-	µg/L	R
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.22	1	µg/L	U
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.22	1	µg/L	U
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.22	1	µg/L	U
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.16	1	µg/L	U
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.16	1	µg/L	U
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	1,2-DIBROMOETHANE (EDB)	WW	N1	ND	0.16	1	µg/L	U
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	1,2-DICHLOROENZENE	WW	N1	ND	0.26	1	µg/L	U
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	1,2-DICHLOROENZENE	WW	N1	ND	0.26	1	µg/L	U
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	1,2-DICHLOROENZENE	WW	N1	ND	0.26	1	µg/L	U
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	1,2-DICHLOROENZENE	WW	N1	ND	0.12	1	µg/L	U
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	1,2-DICHLOROENZENE	WW	N1	ND	0.12	1	µg/L	U
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	1,2-DICHLOROENZENE	WW	N1	ND	0.12	1	µg/L	U
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	1,2-DICHLOROETHANE	WW	N1	ND	0.18	1	µg/L	U
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	1,2-DICHLOROETHANE	WW	N1	ND	0.18	1	µg/L	U
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	1,2-DICHLOROETHANE	WW	N1	ND	0.18	1	µg/L	U
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	1,2-DICHLOROETHANE	WW	N1	ND	0.1	1	µg/L	UJ
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	1,2-DICHLOROETHANE	WW	N1	ND	0.1	1	µg/L	U
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	1,2-DICHLOROETHANE	WW	N1	ND	0.1	1	µg/L	U
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	1,2-DICHLOROPROPANE	WW	N1	ND	0.15	1	µg/L	U
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	1,2-DICHLOROPROPANE	WW	N1	ND	0.15	1	µg/L	U
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	1,2-DICHLOROPROPANE	WW	N1	ND	0.15	1	µg/L	U
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	1,2-DICHLOROPROPANE	WW	N1	ND	0.1	1	µg/L	U
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	1,2-DICHLOROPROPANE	WW	N1	ND	0.1	1	µg/L	U
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	1,2-DICHLOROPROPANE	WW	N1	ND	0.1	1	µg/L	U
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	1,3-DICHLOROENZENE	WW	N1	ND	0.24	1	µg/L	U
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	1,3-DICHLOROENZENE	WW	N1	ND	0.24	1	µg/L	U
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	1,3-DICHLOROENZENE	WW	N1	ND	0.24	1	µg/L	U

**Appendix D**  
**Treatment Plant Monitoring Data January - December 1999**

Location	Sample ID	Control Number	Date	Method	Analyte	Matrix	Type	Result	DL	RL	Units	Qual
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	1,3-DICHLOROBENZENE	WW	N1	ND	0.093	1	µg/L	U
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	1,3-DICHLOROBENZENE	WW	N1	ND	0.093	1	µg/L	U
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	1,3-DICHLOROBENZENE	WW	N1	ND	0.093	1	µg/L	U
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	1,4-DICHLOROBENZENE	WW	N1	ND	0.2	1	µg/L	U
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	1,4-DICHLOROBENZENE	WW	N1	ND	0.2	1	µg/L	U
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	1,4-DICHLOROBENZENE	WW	N1	ND	0.2	1	µg/L	U
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	1,4-DICHLOROBENZENE	WW	N1	ND	0.097	1	µg/L	U
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	1,4-DICHLOROBENZENE	WW	N1	ND	0.097	1	µg/L	U
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	1,4-DICHLOROBENZENE	WW	N1	ND	0.097	1	µg/L	U
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	2-HEXANONE	WW	N1	ND	0.87	5	µg/L	U
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	2-HEXANONE	WW	N1	ND	0.87	5	µg/L	U
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	2-HEXANONE	WW	N1	ND	0.87	5	µg/L	U
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	2-HEXANONE	WW	N1	ND	0.53	5	µg/L	U
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	2-HEXANONE	WW	N1	ND	0.53	5	µg/L	U
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	2-HEXANONE	WW	N1	ND	0.53	5	µg/L	U
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	ACETONE	WW	N1	-	-	-	µg/L	R
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	ACETONE	WW	N1	-	-	-	µg/L	R
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	ACETONE	WW	N1	-	-	-	µg/L	R
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	ACETONE	WW	N1	-	-	-	µg/L	R
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	ACETONE	WW	N1	-	-	-	µg/L	R
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	ACETONE	WW	N1	-	-	-	µg/L	R
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	BENZENE	WW	N1	ND	0.19	1	µg/L	U
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	BENZENE	WW	N1	ND	0.19	1	µg/L	U
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	BENZENE	WW	N1	ND	0.19	1	µg/L	U
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	BENZENE	WW	N1	ND	0.099	1	µg/L	U
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	BENZENE	WW	N1	ND	0.099	1	µg/L	U
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	BENZENE	WW	N1	ND	0.099	1	µg/L	U
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	BROMOCHLOROMETHANE	WW	N1	ND	0.23	1	µg/L	U
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	BROMOCHLOROMETHANE	WW	N1	ND	0.23	1	µg/L	U
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	BROMOCHLOROMETHANE	WW	N1	ND	0.23	1	µg/L	U
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	BROMOCHLOROMETHANE	WW	N1	ND	0.17	1	µg/L	U
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	BROMOCHLOROMETHANE	WW	N1	ND	0.17	1	µg/L	U
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	BROMOCHLOROMETHANE	WW	N1	ND	0.17	1	µg/L	U
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	BROMODICHLOROMETHANE	WW	N1	ND	0.19	1	µg/L	U
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	BROMODICHLOROMETHANE	WW	N1	ND	0.19	1	µg/L	U
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	BROMODICHLOROMETHANE	WW	N1	ND	0.19	1	µg/L	U
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	BROMODICHLOROMETHANE	WW	N1	ND	0.14	1	µg/L	U
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	BROMODICHLOROMETHANE	WW	N1	ND	0.14	1	µg/L	U
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	BROMODICHLOROMETHANE	WW	N1	ND	0.14	1	µg/L	U
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	BROMOFORM	WW	N1	ND	0.27	1	µg/L	U

**Appendix D**  
**Treatment Plant Monitoring Data January - December 1999**

Location	Sample ID	Control Number	Date	Method	Analyte	Matrix	Type	Result	DL	RL	Units	Qual
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	BROMOFORM	WW	N1	ND	0.27	1	µg/L	U
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	BROMOFORM	WW	N1	ND	0.27	1	µg/L	U
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	BROMOFORM	WW	N1	ND	0.11	1	µg/L	U
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	BROMOFORM	WW	N1	ND	0.11	1	µg/L	U
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	BROMOFORM	WW	N1	ND	0.11	1	µg/L	U
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	BROMOMETHANE	WW	N1	ND	0.16	1	µg/L	U
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	BROMOMETHANE	WW	N1	ND	0.16	1	µg/L	U
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	BROMOMETHANE	WW	N1	ND	0.16	1	µg/L	U
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	BROMOMETHANE	WW	N1	ND	0.13	1	µg/L	U
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	BROMOMETHANE	WW	N1	ND	0.13	1	µg/L	U
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	BROMOMETHANE	WW	N1	ND	0.13	1	µg/L	U
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	CARBON DISULFIDE	WW	N1	ND	0.21	1	µg/L	U
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	CARBON DISULFIDE	WW	N1	ND	0.21	1	µg/L	U
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	CARBON DISULFIDE	WW	N1	ND	0.21	1	µg/L	U
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	CARBON DISULFIDE	WW	N1	ND	0.11	1	µg/L	U
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	CARBON DISULFIDE	WW	N1	ND	0.11	1	µg/L	U
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	CARBON DISULFIDE	WW	N1	ND	0.11	1	µg/L	U
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	CARBON TETRACHLORIDE	WW	N1	ND	0.16	1	µg/L	U
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	CARBON TETRACHLORIDE	WW	N1	ND	0.16	1	µg/L	U
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	CARBON TETRACHLORIDE	WW	N1	ND	0.16	1	µg/L	U
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	CARBON TETRACHLORIDE	WW	N1	ND	0.1	1	µg/L	UJ
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	CARBON TETRACHLORIDE	WW	N1	ND	0.1	1	µg/L	U
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	CARBON TETRACHLORIDE	WW	N1	ND	0.1	1	µg/L	U
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	CHLOROBENZENE	WW	N1	ND	0.19	1	µg/L	U
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	CHLOROBENZENE	WW	N1	ND	0.19	1	µg/L	U
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	CHLOROBENZENE	WW	N1	ND	0.19	1	µg/L	U
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	CHLOROBENZENE	WW	N1	ND	0.1	1	µg/L	U
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	CHLOROBENZENE	WW	N1	ND	0.1	1	µg/L	U
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	CHLOROBENZENE	WW	N1	ND	0.1	1	µg/L	U
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	CHLOROETHANE	WW	N1	ND	0.19	1	µg/L	U
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	CHLOROETHANE	WW	N1	ND	0.19	1	µg/L	U
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	CHLOROETHANE	WW	N1	ND	0.19	1	µg/L	U
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	CHLOROETHANE	WW	N1	ND	0.15	1	µg/L	U
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	CHLOROETHANE	WW	N1	ND	0.15	1	µg/L	U
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	CHLOROETHANE	WW	N1	ND	0.15	1	µg/L	U
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	CHLOROFORM	WW	N1	ND	0.16	1	µg/L	U
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	CHLOROFORM	WW	N1	ND	0.16	1	µg/L	U
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	CHLOROFORM	WW	N1	ND	0.16	1	µg/L	U
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	CHLOROFORM	WW	N1	ND	0.11	1	µg/L	U
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	CHLOROFORM	WW	N1	ND	0.11	1	µg/L	U

**Appendix D**  
**Treatment Plant Monitoring Data January - December 1999**

Location	Sample ID	Control Number	Date	Method	Analyte	Matrix	Type	Result	DL	RL	Units	Qual
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	CHLOROFORM	WW	N1	ND	0.11	1	µg/L	U
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	CHLOROMETHANE	WW	N1	ND	0.18	1	µg/L	U
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	CHLOROMETHANE	WW	N1	ND	0.18	1	µg/L	U
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	CHLOROMETHANE	WW	N1	ND	0.18	1	µg/L	U
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	CHLOROMETHANE	WW	N1	ND	0.13	1	µg/L	U
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	CHLOROMETHANE	WW	N1	ND	0.13	1	µg/L	U
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	CHLOROMETHANE	WW	N1	ND	0.13	1	µg/L	U
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	CIS-1,2-DICHLOROETHENE	WW	N1	ND	0.2	1	µg/L	U
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	CIS-1,2-DICHLOROETHENE	WW	N1	ND	0.2	1	µg/L	U
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	CIS-1,2-DICHLOROETHENE	WW	N1	ND	0.2	1	µg/L	U
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	CIS-1,2-DICHLOROETHENE	WW	N1	ND	0.13	1	µg/L	U
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	CIS-1,2-DICHLOROETHENE	WW	N1	ND	0.13	1	µg/L	U
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	CIS-1,2-DICHLOROETHENE	WW	N1	ND	0.13	1	µg/L	U
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	CIS-1,3-DICHLOROPROPENE	WW	N1	ND	0.14	1	µg/L	U
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	CIS-1,3-DICHLOROPROPENE	WW	N1	ND	0.14	1	µg/L	U
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	CIS-1,3-DICHLOROPROPENE	WW	N1	ND	0.14	1	µg/L	U
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	CIS-1,3-DICHLOROPROPENE	WW	N1	ND	0.12	1	µg/L	U
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	CIS-1,3-DICHLOROPROPENE	WW	N1	ND	0.12	1	µg/L	U
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	CIS-1,3-DICHLOROPROPENE	WW	N1	ND	0.12	1	µg/L	U
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	DIBROMOCHLOROMETHANE	WW	N1	ND	0.24	1	µg/L	U
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	DIBROMOCHLOROMETHANE	WW	N1	ND	0.24	1	µg/L	U
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	DIBROMOCHLOROMETHANE	WW	N1	ND	0.24	1	µg/L	U
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	DIBROMOCHLOROMETHANE	WW	N1	ND	0.09	1	µg/L	U
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	DIBROMOCHLOROMETHANE	WW	N1	ND	0.09	1	µg/L	U
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	DIBROMOCHLOROMETHANE	WW	N1	ND	0.09	1	µg/L	U
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	ETHYLBENZENE	WW	N1	ND	0.18	1	µg/L	U
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	ETHYLBENZENE	WW	N1	ND	0.18	1	µg/L	U
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	ETHYLBENZENE	WW	N1	ND	0.18	1	µg/L	U
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	ETHYLBENZENE	WW	N1	ND	0.096	1	µg/L	U
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	ETHYLBENZENE	WW	N1	ND	0.096	1	µg/L	U
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	ETHYLBENZENE	WW	N1	ND	0.096	1	µg/L	U
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	METHYL ETHYL KETONE (2-BUTANONE)	WW	N1	-	-	-	µg/L	R
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	METHYL ETHYL KETONE (2-BUTANONE)	WW	N1	ND	0.97	5	µg/L	U
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	METHYL ETHYL KETONE (2-BUTANONE)	WW	N1	-	-	-	µg/L	R
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	METHYL ETHYL KETONE (2-BUTANONE)	WW	N1	-	-	-	µg/L	R
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	METHYL ETHYL KETONE (2-BUTANONE)	WW	N1	-	-	-	µg/L	R
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	METHYL ETHYL KETONE (2-BUTANONE)	WW	N1	ND	1.4	5	µg/L	U
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	METHYL ISOBUTYL KETONE (4-METHYL-2-	WW	N1	ND	0.81	5	µg/L	U
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	METHYL ISOBUTYL KETONE (4-METHYL-2-	WW	N1	ND	0.81	5	µg/L	U
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	METHYL ISOBUTYL KETONE (4-METHYL-2-	WW	N1	ND	0.81	5	µg/L	U

**Appendix D**  
**Treatment Plant Monitoring Data January - December 1999**

Location	Sample ID	Control Number	Date	Method	Analyte	Matrix	Type	Result	DL	RL	Units	Qual
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	METHYL ISOBUTYL KETONE (4-METHYL-2-	WW	N1	ND	0.63	5	µg/L	U
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	METHYL ISOBUTYL KETONE (4-METHYL-2-	WW	N1	ND	0.63	5	µg/L	U
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	METHYL ISOBUTYL KETONE (4-METHYL-2-	WW	N1	ND	0.63	5	µg/L	U
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	METHYL-TERT-BUTYL-ETHER (MTBE)	WW	N1	ND	0.17	1	µg/L	U
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	METHYL-TERT-BUTYL-ETHER (MTBE)	WW	N1	ND	0.17	1	µg/L	U
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	METHYL-TERT-BUTYL-ETHER (MTBE)	WW	N1	ND	0.17	1	µg/L	U
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	METHYL-TERT-BUTYL-ETHER (MTBE)	WW	N1	ND	0.1	1	µg/L	U
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	METHYL-TERT-BUTYL-ETHER (MTBE)	WW	N1	ND	0.1	1	µg/L	U
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	METHYL-TERT-BUTYL-ETHER (MTBE)	WW	N1	ND	0.1	1	µg/L	U
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	METHYLENE CHLORIDE	WW	N1	ND	0.4	5.8	µg/L	U
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	METHYLENE CHLORIDE	WW	N1	ND	0.19	2	µg/L	U
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	METHYLENE CHLORIDE	WW	N1	ND	0.19	2	µg/L	U
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	METHYLENE CHLORIDE	WW	N1	ND	0.16	2	µg/L	U
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	METHYLENE CHLORIDE	WW	N1	ND	0.16	2	µg/L	U
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	METHYLENE CHLORIDE	WW	N1	ND	0.16	2	µg/L	U
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	STYRENE	WW	N1	ND	0.17	1	µg/L	U
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	STYRENE	WW	N1	ND	0.17	1	µg/L	U
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	STYRENE	WW	N1	ND	0.17	1	µg/L	U
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	STYRENE	WW	N1	ND	0.094	1	µg/L	U
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	STYRENE	WW	N1	ND	0.094	1	µg/L	U
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	STYRENE	WW	N1	ND	0.094	1	µg/L	U
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	TETRACHLOROETHENE(PCE)	WW	N1	ND	0.18	1	µg/L	U
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	TETRACHLOROETHENE(PCE)	WW	N1	ND	0.18	1	µg/L	U
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	TETRACHLOROETHENE(PCE)	WW	N1	ND	0.18	1	µg/L	U
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	TETRACHLOROETHENE(PCE)	WW	N1	ND	0.1	1	µg/L	U
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	TETRACHLOROETHENE(PCE)	WW	N1	ND	0.1	1	µg/L	U
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	TETRACHLOROETHENE(PCE)	WW	N1	ND	0.1	1	µg/L	U
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	TOLUENE	WW	N1	ND	0.19	1	µg/L	U
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	TOLUENE	WW	N1	ND	0.19	1	µg/L	U
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	TOLUENE	WW	N1	ND	0.19	1	µg/L	U
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	TOLUENE	WW	N1	ND	0.11	1	µg/L	U
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	TOLUENE	WW	N1	ND	0.11	1	µg/L	U
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	TOLUENE	WW	N1	ND	0.11	1	µg/L	U
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	TRANS-1,2-DICHLOROETHENE	WW	N1	ND	0.18	1	µg/L	U
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	TRANS-1,2-DICHLOROETHENE	WW	N1	ND	0.18	1	µg/L	U
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	TRANS-1,2-DICHLOROETHENE	WW	N1	ND	0.18	1	µg/L	U
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	TRANS-1,2-DICHLOROETHENE	WW	N1	ND	0.12	1	µg/L	U
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	TRANS-1,2-DICHLOROETHENE	WW	N1	ND	0.12	1	µg/L	U
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	TRANS-1,2-DICHLOROETHENE	WW	N1	ND	0.12	1	µg/L	U
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	TRANS-1,3-DICHLOROPROPENE	WW	N1	ND	0.14	1	µg/L	U

**Appendix D**  
**Treatment Plant Monitoring Data January - December 1999**

Location	Sample ID	Control Number	Date	Method	Analyte	Matrix	Type	Result	DL	RL	Units	Qual
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	TRANS-1,3-DICHLOROPROPENE	WW	N1	ND	0.14	1	µg/L	U
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	TRANS-1,3-DICHLOROPROPENE	WW	N1	ND	0.14	1	µg/L	U
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	TRANS-1,3-DICHLOROPROPENE	WW	N1	ND	0.093	1	µg/L	U
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	TRANS-1,3-DICHLOROPROPENE	WW	N1	ND	0.093	1	µg/L	U
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	TRANS-1,3-DICHLOROPROPENE	WW	N1	ND	0.093	1	µg/L	U
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	TRICHLOROETHENE(TCE)	WW	N1	ND	0.16	1	µg/L	U
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	TRICHLOROETHENE(TCE)	WW	N1	ND	0.16	1	µg/L	U
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	TRICHLOROETHENE(TCE)	WW	N1	ND	0.16	1	µg/L	U
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	TRICHLOROETHENE(TCE)	WW	N1	ND	0.12	1	µg/L	U
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	TRICHLOROETHENE(TCE)	WW	N1	ND	0.12	1	µg/L	U
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	TRICHLOROETHENE(TCE)	WW	N1	ND	0.12	1	µg/L	U
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	VINYL CHLORIDE	WW	N1	ND	0.14	1	µg/L	U
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	VINYL CHLORIDE	WW	N1	ND	0.14	1	µg/L	U
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	VINYL CHLORIDE	WW	N1	ND	0.14	1	µg/L	U
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	VINYL CHLORIDE	WW	N1	ND	0.13	1	µg/L	U
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	VINYL CHLORIDE	WW	N1	ND	0.13	1	µg/L	U
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	VINYL CHLORIDE	WW	N1	ND	0.13	1	µg/L	U
69PLT01010	69PLT01010-35	OT-D657407	1/4/99	CVOL	XYLENES, TOTAL	WW	N1	ND	0.2	1	µg/L	U
69PLT01010	69PLT01010-37	OT-D658302	2/1/99	CVOL	XYLENES, TOTAL	WW	N1	ND	0.2	1	µg/L	U
69PLT01010	69PLT01010-38	MM-P000202	3/2/99	CVOL	XYLENES, TOTAL	WW	N1	ND	0.2	1	µg/L	U
69PLT01010	69PLT01010-39	MM-P000507	4/1/99	CVOL	XYLENES, TOTAL	WW	N1	ND	0.29	1	µg/L	U
69PLT01010	69PLT01010-51	MM-P000809	5/4/99	CVOL	XYLENES, TOTAL	WW	N1	ND	0.29	1	µg/L	U
69PLT01010	69PLT01010-56	MM-L008209	7/6/99	CVOL	XYLENES, TOTAL	WW	N1	ND	0.29	1	µg/L	U
69PLT01010	69PLT01010-40	MM-L002006	4/6/99	SW8260	1,1,1-TRICHLOROETHANE	WW	N1	ND	0.328	1	µg/L	U
69PLT01010	69PLT01010-54	MM-L005906	5/21/99	SW8260	1,1,1-TRICHLOROETHANE	WW	N1	ND	0.328	1	µg/L	U
69PLT01010	69PLT01010-55	MM-L006706	6/2/99	SW8260	1,1,1-TRICHLOROETHANE	WW	N1	ND	0.328	1	µg/L	U
69PLT01010	69PLT01010-68	MM-L011206	8/3/99	SW8260	1,1,1-TRICHLOROETHANE	WW	N1	ND	0.328	1	µg/L	U
69PLT01010	69PLT01010-92	MM-L019206	9/7/99	SW8260	1,1,1-TRICHLOROETHANE	WW	N1	ND	0.328	1	µg/L	U
69PLT01010	69PLT01010-94	MM-L020406	10/1/99	SW8260	1,1,1-TRICHLOROETHANE	WW	N1	ND	0.328	1	µg/L	U
69PLT01010	69PLT01010-94	MM-L101106	10/29/99	SW8260	1,1,1-TRICHLOROETHANE	WW	N1	ND	0.328	1	µg/L	U
69PLT01010	69PLT01010-40	MM-L002006	4/6/99	SW8260	1,1-DICHLOROETHENE	WW	N1	ND	0.532	1	µg/L	U
69PLT01010	69PLT01010-54	MM-L005906	5/21/99	SW8260	1,1-DICHLOROETHENE	WW	N1	ND	0.532	1	µg/L	U
69PLT01010	69PLT01010-55	MM-L006706	6/2/99	SW8260	1,1-DICHLOROETHENE	WW	N1	ND	0.532	1	µg/L	U
69PLT01010	69PLT01010-68	MM-L011206	8/3/99	SW8260	1,1-DICHLOROETHENE	WW	N1	ND	0.532	1	µg/L	U
69PLT01010	69PLT01010-92	MM-L019206	9/7/99	SW8260	1,1-DICHLOROETHENE	WW	N1	ND	0.532	1	µg/L	U
69PLT01010	69PLT01010-94	MM-L020406	10/1/99	SW8260	1,1-DICHLOROETHENE	WW	N1	ND	0.532	1	µg/L	U
69PLT01010	69PLT01010-94	MM-L101106	10/29/99	SW8260	1,1-DICHLOROETHENE	WW	N1	ND	0.532	1	µg/L	U
69PLT01010	69PLT01010-40	MM-L002006	4/6/99	SW8260	BENZENE	WW	N1	ND	0.371	1	µg/L	U
69PLT01010	69PLT01010-54	MM-L005906	5/21/99	SW8260	BENZENE	WW	N1	ND	0.371	1	µg/L	U
69PLT01010	69PLT01010-55	MM-L006706	6/2/99	SW8260	BENZENE	WW	N1	ND	0.371	1	µg/L	U

**Appendix D**  
**Treatment Plant Monitoring Data January - December 1999**

Location	Sample ID	Control Number	Date	Method	Analyte	Matrix	Type	Result	DL	RL	Units	Qual
69PLT01010	69PLT01010-68	MM-L011206	8/3/99	SW8260	BENZENE	WW	N1	ND	0.371	1	µg/L	U
69PLT01010	69PLT01010-92	MM-L019206	9/7/99	SW8260	BENZENE	WW	N1	ND	0.371	1	µg/L	U
69PLT01010	69PLT01010-94	MM-L020406	10/1/99	SW8260	BENZENE	WW	N1	ND	0.371	1	µg/L	U
69PLT01010	69PLT01010-94	MM-L101106	10/29/99	SW8260	BENZENE	WW	N1	ND	0.371	1	µg/L	U
69PLT01010	69PLT01010-40	MM-L002006	4/6/99	SW8260	CARBON TETRACHLORIDE	WW	N1	ND	0.222	1	µg/L	U
69PLT01010	69PLT01010-54	MM-L005906	5/21/99	SW8260	CARBON TETRACHLORIDE	WW	N1	ND	0.222	1	µg/L	U
69PLT01010	69PLT01010-55	MM-L006706	6/2/99	SW8260	CARBON TETRACHLORIDE	WW	N1	ND	0.222	1	µg/L	U
69PLT01010	69PLT01010-68	MM-L011206	8/3/99	SW8260	CARBON TETRACHLORIDE	WW	N1	ND	0.222	1	µg/L	U
69PLT01010	69PLT01010-92	MM-L019206	9/7/99	SW8260	CARBON TETRACHLORIDE	WW	N1	ND	0.222	1	µg/L	U
69PLT01010	69PLT01010-94	MM-L020406	10/1/99	SW8260	CARBON TETRACHLORIDE	WW	N1	ND	0.222	1	µg/L	U
69PLT01010	69PLT01010-94	MM-L101106	10/29/99	SW8260	CARBON TETRACHLORIDE	WW	N1	ND	0.222	1	µg/L	U
69PLT01010	69PLT01010-40	MM-L002006	4/6/99	SW8260	CIS-1,2-DICHLOROETHENE	WW	N1	ND	0.215	1	µg/L	U
69PLT01010	69PLT01010-54	MM-L005906	5/21/99	SW8260	CIS-1,2-DICHLOROETHENE	WW	N1	ND	0.215	1	µg/L	U
69PLT01010	69PLT01010-55	MM-L006706	6/2/99	SW8260	CIS-1,2-DICHLOROETHENE	WW	N1	ND	0.215	1	µg/L	U
69PLT01010	69PLT01010-68	MM-L011206	8/3/99	SW8260	CIS-1,2-DICHLOROETHENE	WW	N1	ND	0.215	1	µg/L	U
69PLT01010	69PLT01010-92	MM-L019206	9/7/99	SW8260	CIS-1,2-DICHLOROETHENE	WW	N1	ND	0.215	1	µg/L	U
69PLT01010	69PLT01010-94	MM-L020406	10/1/99	SW8260	CIS-1,2-DICHLOROETHENE	WW	N1	ND	0.215	1	µg/L	U
69PLT01010	69PLT01010-94	MM-L101106	10/29/99	SW8260	CIS-1,2-DICHLOROETHENE	WW	N1	ND	0.215	1	µg/L	U
69PLT01010	69PLT01010-40	MM-L002006	4/6/99	SW8260	ETHYLBENZENE	WW	N1	ND	0.282	1	µg/L	U
69PLT01010	69PLT01010-54	MM-L005906	5/21/99	SW8260	ETHYLBENZENE	WW	N1	ND	0.282	1	µg/L	U
69PLT01010	69PLT01010-55	MM-L006706	6/2/99	SW8260	ETHYLBENZENE	WW	N1	ND	0.282	1	µg/L	U
69PLT01010	69PLT01010-68	MM-L011206	8/3/99	SW8260	ETHYLBENZENE	WW	N1	ND	0.282	1	µg/L	U
69PLT01010	69PLT01010-92	MM-L019206	9/7/99	SW8260	ETHYLBENZENE	WW	N1	ND	0.282	1	µg/L	U
69PLT01010	69PLT01010-94	MM-L020406	10/1/99	SW8260	ETHYLBENZENE	WW	N1	ND	0.282	1	µg/L	U
69PLT01010	69PLT01010-94	MM-L101106	10/29/99	SW8260	ETHYLBENZENE	WW	N1	ND	0.282	1	µg/L	U
69PLT01010	69PLT01010-40	MM-L002006	4/6/99	SW8260	M,P-XYLENE (SUM OF ISOMERS)	WW	N1	ND	0.406	1	µg/L	U
69PLT01010	69PLT01010-54	MM-L005906	5/21/99	SW8260	M,P-XYLENE (SUM OF ISOMERS)	WW	N1	ND	0.406	1	µg/L	U
69PLT01010	69PLT01010-55	MM-L006706	6/2/99	SW8260	M,P-XYLENE (SUM OF ISOMERS)	WW	N1	ND	0.406	2	µg/L	U
69PLT01010	69PLT01010-68	MM-L011206	8/3/99	SW8260	M,P-XYLENE (SUM OF ISOMERS)	WW	N1	ND	0.406	2	µg/L	U
69PLT01010	69PLT01010-92	MM-L019206	9/7/99	SW8260	M,P-XYLENE (SUM OF ISOMERS)	WW	N1	ND	0.406	1	µg/L	U
69PLT01010	69PLT01010-94	MM-L020406	10/1/99	SW8260	M,P-XYLENE (SUM OF ISOMERS)	WW	N1	ND	0.406	1	µg/L	U
69PLT01010	69PLT01010-94	MM-L101106	10/29/99	SW8260	M,P-XYLENE (SUM OF ISOMERS)	WW	N1	ND	0.406	1	µg/L	U
69PLT01010	69PLT01010-40	MM-L002006	4/6/99	SW8260	O-XYLENE (1,2-DIMETHYLBENZENE)	WW	N1	ND	0.289	1	µg/L	U
69PLT01010	69PLT01010-54	MM-L005906	5/21/99	SW8260	O-XYLENE (1,2-DIMETHYLBENZENE)	WW	N1	ND	0.289	1	µg/L	U
69PLT01010	69PLT01010-55	MM-L006706	6/2/99	SW8260	O-XYLENE (1,2-DIMETHYLBENZENE)	WW	N1	ND	0.289	1	µg/L	U
69PLT01010	69PLT01010-68	MM-L011206	8/3/99	SW8260	O-XYLENE (1,2-DIMETHYLBENZENE)	WW	N1	ND	0.289	1	µg/L	U
69PLT01010	69PLT01010-92	MM-L019206	9/7/99	SW8260	O-XYLENE (1,2-DIMETHYLBENZENE)	WW	N1	ND	0.289	1	µg/L	U
69PLT01010	69PLT01010-94	MM-L020406	10/1/99	SW8260	O-XYLENE (1,2-DIMETHYLBENZENE)	WW	N1	ND	0.289	1	µg/L	U
69PLT01010	69PLT01010-94	MM-L101106	10/29/99	SW8260	O-XYLENE (1,2-DIMETHYLBENZENE)	WW	N1	ND	0.289	1	µg/L	U
69PLT01010	69PLT01010-40	MM-L002006	4/6/99	SW8260	TETRACHLOROETHENE(PCE)	WW	N1	ND	0.288	1	µg/L	U

**Appendix D**  
**Treatment Plant Monitoring Data January - December 1999**

Location	Sample ID	Control Number	Date	Method	Analyte	Matrix	Type	Result	DL	RL	Units	Qual
69PLT01010	69PLT01010-54	MM-L005906	5/21/99	SW8260	TETRACHLOROETHENE(PCE)	WW	N1	ND	0.288	1	µg/L	U
69PLT01010	69PLT01010-55	MM-L006706	6/2/99	SW8260	TETRACHLOROETHENE(PCE)	WW	N1	ND	0.288	1	µg/L	U
69PLT01010	69PLT01010-68	MM-L011206	8/3/99	SW8260	TETRACHLOROETHENE(PCE)	WW	N1	ND	0.288	1	µg/L	U
69PLT01010	69PLT01010-92	MM-L019206	9/7/99	SW8260	TETRACHLOROETHENE(PCE)	WW	N1	ND	0.288	1	µg/L	U
69PLT01010	69PLT01010-94	MM-L020406	10/1/99	SW8260	TETRACHLOROETHENE(PCE)	WW	N1	ND	0.288	1	µg/L	U
69PLT01010	69PLT01010-94	MM-L101106	10/29/99	SW8260	TETRACHLOROETHENE(PCE)	WW	N1	ND	0.288	1	µg/L	U
69PLT01010	69PLT01010-40	MM-L002006	4/6/99	SW8260	TOLUENE	WW	N1	ND	0.197	1	µg/L	U
69PLT01010	69PLT01010-54	MM-L005906	5/21/99	SW8260	TOLUENE	WW	N1	ND	0.197	1	µg/L	U
69PLT01010	69PLT01010-55	MM-L006706	6/2/99	SW8260	TOLUENE	WW	N1	ND	0.197	1	µg/L	U
69PLT01010	69PLT01010-68	MM-L011206	8/3/99	SW8260	TOLUENE	WW	N1	ND	0.197	1	µg/L	U
69PLT01010	69PLT01010-92	MM-L019206	9/7/99	SW8260	TOLUENE	WW	N1	ND	0.197	1	µg/L	U
69PLT01010	69PLT01010-94	MM-L020406	10/1/99	SW8260	TOLUENE	WW	N1	ND	0.197	1	µg/L	U
69PLT01010	69PLT01010-94	MM-L101106	10/29/99	SW8260	TOLUENE	WW	N1	ND	0.197	1	µg/L	U
69PLT01010	69PLT01010-40	MM-L002006	4/6/99	SW8260	TRANS-1,2-DICHLOROETHENE	WW	N1	ND	0.168	1	µg/L	U
69PLT01010	69PLT01010-54	MM-L005906	5/21/99	SW8260	TRANS-1,2-DICHLOROETHENE	WW	N1	ND	0.168	1	µg/L	U
69PLT01010	69PLT01010-55	MM-L006706	6/2/99	SW8260	TRANS-1,2-DICHLOROETHENE	WW	N1	ND	0.168	1	µg/L	U
69PLT01010	69PLT01010-68	MM-L011206	8/3/99	SW8260	TRANS-1,2-DICHLOROETHENE	WW	N1	ND	0.168	1	µg/L	U
69PLT01010	69PLT01010-92	MM-L019206	9/7/99	SW8260	TRANS-1,2-DICHLOROETHENE	WW	N1	ND	0.168	1	µg/L	U
69PLT01010	69PLT01010-94	MM-L020406	10/1/99	SW8260	TRANS-1,2-DICHLOROETHENE	WW	N1	ND	0.168	1	µg/L	U
69PLT01010	69PLT01010-94	MM-L101106	10/29/99	SW8260	TRANS-1,2-DICHLOROETHENE	WW	N1	ND	0.168	1	µg/L	U
69PLT01010	69PLT01010-40	MM-L002006	4/6/99	SW8260	TRICHLOROETHENE(TCE)	WW	N1	ND	0.322	1	µg/L	U
69PLT01010	69PLT01010-54	MM-L005906	5/21/99	SW8260	TRICHLOROETHENE(TCE)	WW	N1	ND	0.322	1	µg/L	U
69PLT01010	69PLT01010-55	MM-L006706	6/2/99	SW8260	TRICHLOROETHENE(TCE)	WW	N1	ND	0.322	1	µg/L	U
69PLT01010	69PLT01010-68	MM-L011206	8/3/99	SW8260	TRICHLOROETHENE(TCE)	WW	N1	ND	0.322	1	µg/L	U
69PLT01010	69PLT01010-92	MM-L019206	9/7/99	SW8260	TRICHLOROETHENE(TCE)	WW	N1	ND	0.322	1	µg/L	U
69PLT01010	69PLT01010-94	MM-L020406	10/1/99	SW8260	TRICHLOROETHENE(TCE)	WW	N1	ND	0.322	1	µg/L	U
69PLT01010	69PLT01010-94	MM-L101106	10/29/99	SW8260	TRICHLOROETHENE(TCE)	WW	N1	ND	0.322	1	µg/L	U

DL = detection limit

J = estimated result

mg/L = milligrams per liter

N1 = native sample

ND = nondetect

R = rejected data point

RL = reporting limit

U = nondetect

UU = estimated nondetect

µg/L = micrograms per liter

Dates and locations of carbon exchanges in 1999: Carbon was exchanged in vessel 101A on 20 April 1999 and 16 December 1999. Carbon was exchanged in vessel 101B on 24 August 1999.

## **APPENDIX E**

### **Summary of Wetland 1285 Vegetation**

## SUMMARY OF WETLAND 1285 VEGETATION

The Air Force Center for Environmental Excellence has recommended eliminating Wetland 1285 as an ecosystem of concern. Wetland 1285 is a palustrine forested wetland established on an abandoned cranberry bog adjacent to the Coonamessett River. Red maple (*Acer rubrum*) is the dominant tree species in the canopy with an estimated cover class of 51 percent to 75 percent. Mature trees are approximately 50 to 60 feet in height, with trunk diameters at breast height (dbh) averaging from 7.7 inches to 15.9 inches. Associate tree species recorded in the canopy layer include tupelo (*Nyssa sylvatica*) and pitch pine (*Pinus rigida*) on the abandoned bog, while Bebb willow (*Salix bebbiana*) is common on the side-cast material along the margin of the river. Shallow root systems were evident at the windfalls within the wetland. The soil profile contains a distinct Ap Horizon which reflects the past history of sanding applications on the cranberry bog while it was active.

The understory shrub layer is comprised of sweet pepperbush (*Clethra alnifolia*), multiflora rose (*Rosa multiflora*), and black alder (*Ilex verticillata*). Associate members of the understory layer include highbush blueberry swamp azalea (*Rhododendron viscosum*), highbush blueberry (*Vaccinium corymbosum*), northern arrowwood (*Viburnum dentatum*), and Japanese barberry (*Berberis thunbergii*). The shrub layer is moderate to dense with an estimated cover class of 51 percent to 75 percent. The shrubs are relatively uniformly distributed throughout the wetland. Herbaceous ground covers are poorly represented in the forested wetland because of the heavy shade. Representative species include Canada mayflower (*Maianthemum canadense*), sensitive fern (*Onoclea sensibilis*), and cinnamon fern (*Osmunda cinnamomea*). Vines of bullbrier (*Smilax rotundifolia*) which are common throughout the understory community also reflect the history of vegetative management and soil disturbance at the site.

The forested wetland present on the abandoned cranberry bog has developed in concert with the water level fluctuations associated with the routine manipulation and management of water levels in an active cranberry bog operation. The forested wetland is subject to inundation during the winter months due to the practice of holding water on

the bogs for extended periods of time during the winter. The duration of winter flooding is dependent on snow and ice conditions. Evidence of the winter is seen in the water-stained leaves on the floor of the wetland.

Facultative species (red maple, tupelo, sweet pepperbush, northern arrowwood, etc.) and facultative upland species (pitch pine and multiflora rose) are dominant in the canopy and shrub understory layer. Facultative species have a 34 percent to 66 percent probability that they will occur in either wetland or non-wetland habitats. Facultative upland species have a 67 percent to 99 percent probability that they will occur in non-wetland habitats. The majority of the recorded species are associated with seasonally flooded wetland systems with extended dry periods. The plant community on the abandoned cranberry bog will not be significantly impacted by water level fluctuations that may result from the operation of the shallow extraction wells on the adjacent cranberry bog. Facultative wetland indicator species, such as highbush blueberry and swamp azalea, are common to wetland environments, but they are also common associate species in moist thickets and upland forest habitat within the region.

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14 September 2000

Mr. Robert M. Gill  
Remediation Program Manager  
HQ AFCEE/MMR  
322 East Inner Road  
Otis ANG Base, MA 02542-5028

SUBJECT: Contract F41624-97-D-8006  
MMR Plume Response Program  
DO 0030 DCN/PROJECT # AFC-J23-35U40502-M17-0010  
***Final Fuel Spill-28 Treatment System 1999 Annual System  
Performance and Ecological Impact Monitoring Report***

Dear Mr. Gill:

As directed by the Air Force Center for Environmental Excellence, Jacobs Engineering Group Inc. is providing 16 bound copies, one unbound copy, and one electronic copy of the above-referenced document. Copies are also being sent to the appropriate agencies.

Please feel free to contact me or Ron Citterman at (508) 564-5746, extension 309, if you have any questions or comments. Mr. Marty Aker is the Air Force point of contact for this project.

Sincerely,



Douglas S. Hodge  
Acting Program Manager

DSH/mkp

Enclosures: Document (16 bound, 1 unbound & 1 EDD)

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